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DECORATION

CONSTRUCTION

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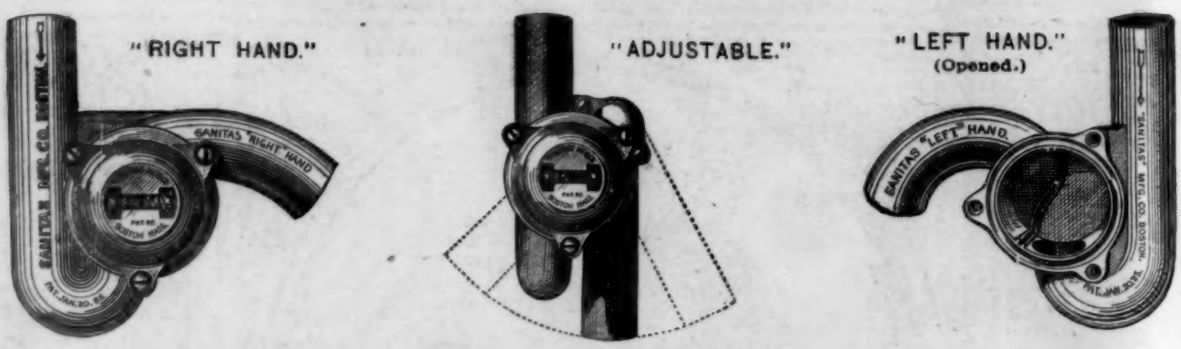

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THE Western New York Association of Architects held its second annual convention last week, with an attendance of about twenty-five members. The usual questions, about the licensing of architects and the regulation of competitions, were brought up, and informally discussed. Mr. Carlin of Buffalo, the Secretary of the Association, read to the Convention the draft of the bill which is to be presented to the Illinois Legislature, to restrain persons who have not passed a satisfactory examination, before a board appointed by the State, from practising architecture within the State; and a committee consisting of Mr. Carlin, Mr. Dockstader of Elmira, and Mr. Colton of Syracuse, was appointed to consider the advisability of presenting a similar bill to the New York Legislature. Another committee, consisting of Messrs. Curtis of Fredonia, Marling of Buffalo, and Walker of Rochester, was appointed to consider the subject of uniform contracts; and the committee on competitions was continued for the purpose of enabling it to draw up a set of propositions in regard to such matters, which it proposes to have adopted by the Association as suggestions, rather than fixed rules. We suppose it is needless, at this day, to point out the advantage to the profession of such discussions. Although the topic of competitions is tolerably well worn in the deliberations of architects, and that of the regulation of practice hardly less so, some advance is made every year in both of them. About ten years ago, the Boston Society of Architects had a "Tract on Competitions" prepared, presenting the principles for which the profession has fought so long. As a tract, it was interesting, and convincing, to architects, but the idea of attempting to induce the public to conform to it was at that time almost ridiculous, and we doubt whether many copies were circulated, unless as curiosities, outside of professional circles. A few years afterward the English architects, under the lead of a group of resolute and distinguished men, joined in a movement to establish public competitions on a satisfactory basis, which soon secured the adhesion of nearly every respectable architect in Great Britain, and has already completely transformed the relation of architects to important public work. After the formation of the Western Association of Architects in this country, the leaders of that body took early occasion to secure an emphatic expression of opinion on the subject; and now the State and local societies seem to be in a fair way to finish the work by the adoption of rules which will be binding on their own members, and will soon become familiar to the comparatively limited public with which each society deals. The Missouri State Association has already formally adopted the principles generally approved in the profession; the Boston Society has done the same, and has issued a new pamphlet of rules and suggestions, of which each member receives a number of copies, for distribution where they may be needed; and if the Western New York Association, followed by the others, will do the same, the battle for justice and fair treatment will be nearly won.

SOME of the people in Rhode Island are beginning to be sorry that they passed a new lien law last year, giving material-men a lien, without notice to the owner, and sixty days in which to file the claim. A certain school-house has just been completed in East Providence, under the direction of Messrs. W. R. Walker & Son, as architects, and the full contract price, together with a trifling sum for extras, was promptly paid to the contractor, a man named Moulton, after the completion of the structure. About two weeks after the final payment to the contractor, Messrs. J. B. Gurney & Son, Fred E. Hovey, and J. C. Dodge & Son filed liens for materials furnished to Moulton, to the amount of five hundred and twenty-two dollars and some cents. No bonds were required of the contractor, and as he has just assigned his wages, and mortgaged his personal property, it looks very much as if the town would have to pay the amount of the liens, with costs. Naturally enough, the taxpayers blame the School Committee, or rather, the Superintendent of Schools, who was delegated by the committee to attend to the matter, for paying the contractor in full before the time for filing liens had expired, and the Superintendent transfers the blame to the architects, who, as he says, gave Moulton certificates, on receipt of which he was bound to make payments. The truth appears to be that neither was much to blame, if at all. Moulton, it seems, went to the architects, saying that the Superintendent wished them to give him a certificate for a certain amount, and they, knowing that matters of payment are very often, much too often, in fact, arranged between the builder and the owner, or the representative of the owner, without consulting the architect, believed what he said, and gave the certificates, looking out that they did not exceed the contract price, and undoubtedly supposing that the Superintendent would take the necessary precautions to protect the town against liens. On his part, the Superintendent probably supposed, as he says, that the architects' certificate amounted to an order to him to pay the sum mentioned at once, without inquiry or reserve. Of course, we know that this is an error, the architect's certificate being simply an expression of his opinion that the money is due, which imposes no obligation upon the owner to make the payment if he has reasons, which may have been unknown to the architect, or forgotten by him, for not doing so, but it is a very common error, and the novelty of the law, under which this seems to be the first case, probably helped both parties to forget it. The next time that the town builds a school-house, it will probably require bonds from the contractor; and we advise architects who may be called upon to practise in Rhode Island to draw their contracts in such a way that a sum ample to cover all possible liens, for materials or wages, may be reserved until the time within which they can be filed shall have expired.

A GERMAN engineer has published some observations on the most efficient method of excavating streets in frosty weather, which we find copied in two or three of the foreign technical journals. Every one knows the difficulty of making any impression with ordinary tools on frozen ground, and a surface protected with paving-stones is even more intractable than ordinary material. Unless fires can be lighted over the line of the proposed trench, so as to thaw the ground beneath them, the usual way is to pick, painfully and slowly, into the hard, tough mass until a sufficient depth is reached, or the frozen stratum is penetrated. According to Herr Schindler, who has carried his theory into successful practice, much of the labor incidental to such work may be saved by considering that the ground does not freeze all at once into a homogeneous mass, but by successive stages, which produce a stratified condition, something like that of sandstone or limestone. If the work is carried on vertically downward from the surface, the material, whether of stratified stone or frozen earth, must be removed in small particles, while, by

taking advantage of the stratification, and working horizontally from a shaft or an exposed face, the material may be split off in large pieces through the seams between the strata. Where earth has been filled-in, the strata do not always lie horizontally, but may follow the surfaces of successive deposits of material. Such cases are, however, easily distinguished, and with a little care on this point, after a pit has been sunk in the spot where the excavation is to begin, the operation may be continued rapidly and successfully by means of iron wedges, long and short, which are driven horizontally as the work advances, and lift and break up the frozen earth in large sheets until the necessary depth is attained.

SOME good people in Remscheid, in Rhenish Prussia, have recently carried out a coöperative building scheme on rather a new plan. Remscheid is a town of fifteen or twenty thousand inhabitants, who occupy themselves principally in blacksmith work, making, with the help of forges set up at their homes, small wrought-iron articles, which are shipped to all parts of the world. The managers of the new enterprise began their work with the sensible step of ascertaining the exact rents paid for the existing tenements by the persons whom they wished to aid in securing houses of their own. For this purpose, they distributed circulars through the quarters inhabited by working people, asking each householder who might receive one to give, over his signature, the number of persons in his family; the number of rooms occupied by them; the rent paid; the amount of land attached to the house, and so on. Six hundred and forty-seven circulars were returned, properly filled out. From these, which certainly presented a tolerably reliable view of the condition of the working-people of the town, it appeared that the most expensive tenements were those in the immediate neighborhood of the railway station, which brought about twenty dollars a year per room, without water-service, or twenty-three dollars with water-supply. The attics in the same houses brought about two-thirds the rent of the first and second story rooms. Tenements at some distance from the centre of the town brought, for the first and second story rooms, about two-thirds the rent of the more conveniently located ones, while the rent of the attics was very little less. In the outlying districts the average rents were about one-half those in the middle of the town. In regard to the number of rooms occupied by each family, it appeared that the people intelligent enough to reply to the circulars lived, on an average, two in a room. One hundred and twenty-one, out of the six hundred and forty seven persons who answered, said that their families slept three in a room, on an average, and in twenty-six cases there were four or five persons to a room. A comparison of the rents paid with the cost of the houses mentioned in the replies, including the value of the land on which they stood, showed that they brought in an average return of about eleven per cent a year above expenses; and in some cases the income was as much as fifteen per cent. As the account, which we find in the *Deutsche Bauzeitung*, justly says, these facts showed plainly that there was not only need of cheap and wholesome houses for workingmen, but that the rents which they would command would pay a good interest on the cost. A company was, therefore, formed, with a capital of forty-four thousand dollars, land was bought in several different quarters of the town, and the construction of houses commenced. The constitution of the company was much like that of similar corporations here, the liability of each stockholder for the debts of the company being limited to the value of his paid or secured interest in its property, and the administration being placed in the hands of officers elected by the members. At present, the company builds houses either for sale or rent, or buys them, to sell again, where this may seem advisable. Of those built by the company, some are detached, and some "semi-detached," as the English say, or "double," to use our word. A single house sells for fifteen hundred dollars, to which one hundred and fifty is added if a blacksmith's shop is attached to it. One-half of a double-house brings twelve hundred and fifty dollars. If a member wishes to hire a house, instead of buying it, he pays six per cent, net, on the value, as rent. By paying seven per cent, he is entitled to have two per cent set aside as a sinking-fund, leaving five per cent as the net rent. When the sinking-fund reaches one-third of the value of the house, a deed of it is given to the tenant, who becomes thenceforth responsible for the insurance, taxes and repairs. The remaining two-thirds of the value, which is secured by a mortgage on the property, is provided for by requiring the new owner to continue paying five per cent on the full value. Three per cent of this goes as interest on the mortgage, while the remaining two per cent constitutes a new sinking-fund for the extinction of the principal. For the other provisions adopted by the company we must refer persons interested to the original article, or rather, series of articles, or to their author, Herr Walther Lange, Remscheid, Rhenish Prussia. Besides the preliminary collection of statistics, on which to base the work, which strikes us as a particularly commendable idea, the course of the company in buying lots scattered through various parts of the town seems on some accounts very judicious. Among us, certainly, the idea of living in a vast *cité ouvrière*, composed of nothing but small houses, is neither so attractive nor so wholesome for a modest citizen and his family as the consciousness that the handsome mansion of his richer neighbor is not far off, and that it is worth an effort on their part to keep their cottage dainty and attractive, and to look after the appearance and manners of the children, so that they may not suffer by comparison with the carefully trained young people near by; while the corporate property, scattered in this way, is much less likely to suffer serious depreciation in value than if concentrated in a large area, which may be rendered nearly worthless by the establishment of some offensive manufacture near by.

THE French tribunals have made up their minds that the stringing of wires over a house is an injury to the proprietor of the house, for which he should be paid; and we hope that some time the courts of certain commonwealths nearer home may come to the same conclusion. An electric-lighting company, finding that the shortest route for its wires to a place which it wished to reach was over the roof of a house, proceeded, as such companies generally do, to string them across it, without asking the owner's leave. In this country the company would probably have put up poles and frames on the roof, or would have fastened the wires to a chimney, without paying any attention to the protests of the proprietor, but in France the right, or the habit, of appropriating other people's property is not so highly developed as here, and it ventured only to place supports on the neighboring buildings, so that the wires swung free over the house in question. The owner, however, chose to consider the wires an annoyance, and sued for an order to have them removed, and for damages for the injury they had already done him. The company resisted, on the ground that the owner of the house under the wires had no rights in the space through which they were stretched, and that moreover, they did him no harm. The court decided that the ownership of a piece of ground carried with it the ownership of all the space above it capable of being utilized. As to the damage caused by the wires, it held that the possible danger from the current to persons in the house, even if it existed only in imagination, was an injury, while the sound of the wind through the wires was a real annoyance, and the necessity for allowing workmen to walk over the roof, together with the chance that the wires might be broken by a storm, and trail over the tiles, constituted a risk of damage which would not exist if the wires were not there. For these reasons, it ordered the immediate removal of the wires, but decided that the complainant had not, up to the time of the trial, suffered enough injury to give him an appreciable claim for damages.

THE *Wiener Bauindustrie-Zeitung* gives a recipe for a paint, to be applied to woodwork exposed to the weather, which, it says, is proof against all ordinary influences, and is tolerably cheap. No oil is used, but, for the first coat, finely-ground zinc-white is rubbed up with lime-water, and the objects to be painted covered with a good coat of the mixture. When this is dry, which will be in two or three hours, a second coat is applied, composed of a solution of chloride of zinc in lime-water. By the action of the chloride on the oxide of zinc a smooth, shining coating is formed, which is extremely durable, and the paint may even be used, instead of tar, to protect the ends of wooden posts in the ground. Another durable paint, which has the advantage of rendering wood covered with it fire-proof, is composed of one part each of salt, alum, silicate of soda and tungstate of soda, with four parts of lime, mixed, and ground in linseed-oil. Three coats of this paint make a wooden object incombustible, and it is said to last for thirty years exposed to the weather.

ON THE TESTING OF BUILDING STONE.[1]

THE problem of ascertaining the suitability of a stone for any form of structural application is one peculiarly complicated and difficult. Briefly put the question is simply this: By what methods in the laboratory is it possible to ascertain within the space of a few days or weeks the relative strength and durability of any stone for as many generations or even centuries.

In order that the difficulties involved may be fully appreciated, let me present the main points to be considered. In the order of their importance — as I believe — they are:

1. Resistance to changes in temperature.
2. Resistance to the chemical action of an acid atmosphere.
3. Durability of color.
4. Crushing strength and elasticity.
5. Resistance to abrasive action of feet and wind-blown sand.

The order as given above may be subject to modification to suit individual cases. In many instances the actual strength of the stone is a matter of little importance, and in protected situations the qualities mentioned under (3) and (5) may be of no essential value. In still other cases, as in bridge abutments, strength and elasticity are matters of greatest import, while that of change of color can be left wholly out of consideration. In the arrangement given above I have had especial regard to stone exposed in the exterior walls of a building, and in a varied climate like that of the Northern and Eastern United States.

Before proceeding to a discussion of methods by which these essential qualities can be estimated, let me call attention briefly to the peculiarly trying conditions under which a stone thus exposed is placed, and offer a few criticisms on the methods now commonly employed.

None of the conditions under which a stone is commonly placed are more trying than those presented by the ordinary changes of temperature in a climate like that of our Northern and Eastern States. Stones, as a rule, possess but a low conducting power and slight elasticity. They are aggregates of minerals more or less closely cohering, each of which possesses degrees of expansion and contraction of its own. In the crystalline rocks these dissimilar elements are practically in actual contact; in the sandstones they are removed from one another by a slight space occupied wholly or in part by a ferruginous, calcareous or siliceous paste. As temperatures rise, each and every constituent expands more or less, crowding with resistless force against its neighbor; as the temperatures decrease a corresponding contraction takes place. Since with us the temperatures are ever changing, and within a space of even twenty-four hours may vary as much as forty degrees, so within the mass of the stone there is continual movement among its particles. Slight as these movements may be they can but be conducive of one result, a slow and gradual weakening and disintegration.

The effects of moderate temperatures upon stone of ordinary dryness are, however, slight when compared with the destructive energies of freezing temperatures upon stones saturated with moisture. At a temperature of 30 degrees Fahrenheit the pressure exerted by water passing from a liquid to a solid state amounts to not less than 138 tons to the square foot, or as Professor Geikie has strikingly put it, is equal to the weight of a column of ice a mile high. Is it, then, astonishing that a porous sandstone exposed in a house-front to be saturated by a winter's rain and then subjected to temperatures perhaps several degrees below the freezing point shows signs of weakness and exfoliation after a single season's exposure?

Since then, as every quarryman knows, no stone however strong can endure the enormous strain it would be subject to if frozen solid when holding any considerable amount of water confined within its pores, it is but natural to conclude, as a matter of course, that other things being equal those stones are most durable which will absorb and retain the least moisture. This rule is not to be accepted, however, without a considerable grain of allowance, since a coarsely porous stone, though capable of taking up a large amount of moisture will also part with it readily, or if frozen while saturated will permit a considerable proportion of the expansive force of the solidifying water to be expended otherwise than in pushing apart the grains composing it. Otherwise expressed, the water will *freeze out* of a coarsely porous stone, while in one that is compact it may create sad havoc. This is well illustrated by the common occurrence of water freezing in straight cylindrical or widely-expanding vessels, and in narrow-necked pitchers and bottles. In the first instance the open space above is sufficient to allow all the expansion to take place vertically. The narrow-necked vessel, on the other hand, is almost invariably broken.

[1] By George P. Merrill, Curator in the National Museum at Washington.

Still other objections to a porous sandstone than its liability to disintegration on freezing may be given. A stone front, while undoubtedly imposing, may become saturated by prolonged rains, and actually hold tons of water. This in cold weather is slow in evaporating, and must render a house damp, requiring a larger outlay of fuel to render it comfortable. This matter is, in part, remedied by building double walls, the inner of brick. In our climate a stone house constructed otherwise would be well nigh uninhabitable. Moreover, a porous sandstone is, of all stones, most likely to afford foothold for the growth of algæ, lichen and mosses. While it is yet to be proved that these growths are in themselves actually injurious, they are, at least, suggestive of an unhealthy dampness. A stone covered by these organisms will absorb more water and give it up more slowly to evaporation than one whose surfaces are not thus protected.

To ascertain, then, the porosity or ratio of absorption of any stone is an important test; to ascertain the ratio of absorption and resistance to freezing while saturated is a most important, and for a single test the most conclusive of any one test yet suggested. Nevertheless, it is a matter which at present is almost wholly ignored. I will refer later to methods which have been employed to some extent in times past.

The second essential quality, that of resistance to atmospheric chemical agencies, is also one that architects, as a rule, ignore. Like the last, it needs, therefore, to be enlarged upon.

The atmosphere in its normal state consists of a mechanical admixture of nitrogen and oxygen in about the proportion of four volumes of the former to one of the latter, together with minute quantities of carbonic acid, ammonia and vapor of water. In the vicinity of large cities, however, it carries in addition to increased quantities of carbonic acid appreciable amounts of sulphurous, sulphuric, nitric and chlorhydric acids. These, when brought by rains in contact with the walls of buildings are capable throughout many years of time of producing marked results, especially when aided by the extreme diurnal ranges of temperature already alluded to. Carbonate of lime, the material of ordinary marble and limestone is particularly susceptible to the solvent action of these acids, even though they may be present in extremely minute quantities. Of all stones the uncrystalline limestones are most readily effected; the crystalline, if equally compact a trifle less so, and a dolomite still less. It does not necessarily follow, however, that a dolomite will be the more durable, since the questions of texture and tenacity come in for consideration. In the uncrystalline limestones the effects of an acid atmosphere are, perhaps, less noticeable since these stones are not, as a rule, used in finely finished work. The crystalline limestones (marbles) often suffer severely, however. Professor Geikie found that slabs of marble exposed in the climate of Edinburgh lost their polish within the space of a year or two, and became completely illegible within a century.

Professor Julien found that in the city cemeteries about New York the polish on marble tombstones did not often survive over ten years. The writer's own observations on the subject are to the effect that in the cemeteries of the smaller cities and towns of New England marble tombstones will retain their polish for a period of from ten to fifteen years, and up to twenty-five or thirty years will present no signs of disintegration of a very serious nature. Beyond this time the surface becomes rough and granular, and the edges of the stone may be found filled with fine rifts in which particles of dirt become lodged or lichens take root, giving it a dirty and unkempt appearance.

It is to this ready solubility of calcic carbonate that is also due, in large part, the poor weathering qualities of sandstones with calcareous cements. The calcite is slowly removed by solution; the siliceous grains thus become loosened, and falling away under the influence of wind and rain expose fresh surfaces to be acted upon. Certain of the ferrugineous cements are likewise susceptible to the influence of the acidulated rains; though the anhydrous oxide, as it exists in the Potsdam stones, is said to be less soluble than the hydrated oxide occurring in those of Triassic age.

The third essential quality which I have mentioned is that of durability, or permanence of color. Here, again, the chemical action of atmospheres are to be contended with. The possibility that a stone may contain certain constituents which on exposure to the atmosphere will undergo certain chemical changes productive of a simultaneous change in color is apparently not fully realized. No better illustration of the prevailing ignorance on this point — unless indeed it was due wholly to gross carelessness — is needed than that presented by the exterior basement-wall in the new capitol building at Albany, New York. These are built of a light, and in its fresh state, uniformly gray granite. On exposure the numerous included particles of pyrite (iron disulphide) underwent oxidation and in many instances the whole face is so disfigured by blotches of iron-rust as to be very unsightly. Iron in the form of disulphide, protoxide or carbonate is the prime factor in producing color changes in all stone used for architectural purposes. As is well known many a light gray sandstone turns buff or reddish after short exposure in an outer wall. This is brought about through the oxidation of some one of the above-named ingredients. If the resultant tints are uniform the effects are not always objectionable, and indeed are often beneficial. The *mellowing* of a stone with age is due mainly to changes of this nature. If, however, the oxidizing mineral occurs irregularly disseminated in streaks, nests or bunches, the color often appears in dirty blotches

and utterly ruins otherwise beautiful work. While on the whole the presence of an easily oxidizable mineral may or may not be objectionable in the fragmental rocks it is always prejudicial in the crystalline marbles and the granites. It is the presence of finely disseminated pyrite, protoxide or carbonate of iron that renders so unsafe the selection of certain lime and sand stone from below the water-level in the quarry-bed. As there displayed the stone may be beautifully and uniformly dark bluish gray, or drab. The same stone quarried and put in the walls of a building becomes, owing to oxidation, of dull yellow or brownish hue.

Crushing strength and elasticity. — If we are to judge from the ordinary modes of procedure the crushing strength of a stone is considered by architects and engineers in general as the one essential quality. Scarcely a public building of any importance is erected but a long series of crushing tests is inaugurated at a considerable outlay of time and consequent expense. These tests are applied to rectangular blocks of all sizes and with ever-varying results, and this in the face of the fact that there is to-day scarcely a stone upon the market that will not bear at least fifty times the pressure likely to be demanded of it under any but the most exceptional circumstances. The stone in the bottom courses of the Washington monument, in this city, and that bears the entire weight of the superincumbent 550 feet, is a stone so weak and of such poor weathering qualities as to be practically out of the market, yet its pressure-tests will show a strength many times greater than will be required of it under the most trying conditions of wind and weather. Indeed, I have yet to learn of a single instance in which a stone built into a wall has become crushed through any inherent weakness of the stone itself. Blocks have become broken, or scaled on the edges through unequal settling of the foundation or improper bedding, but the number of instances in which a stone properly laid has actually crushed through inability to withstand the strain are, I believe, so few that they may almost wholly be left out of consideration. In short we may safely take it for granted that the majority of stones are fully strong enough for all ordinary structural application. What is desired is not a knowledge of its actual strength to-day but rather its power to resist for a century and more the severe trials above enumerated. The tests as now applied will give no clew to this, whatever.

The elasticity of a stone is, I believe, a matter of much greater importance. It will be remembered that it was found necessary not long ago to substitute iron in place of the stone towers of the Niagara Suspension Bridge. The original towers were of an impure magnesian limestone with seams of gypsum. Under the constant strain from the bridge and loaded trains this gradually became filled with rifts and cracks, rendering necessary their replacement by other material. Pressure tests would have shown the stone to have originally possessed all necessary strength. The individual grains of which it was composed did not, however, possess sufficient elasticity and cohesive force to yield to the strain and regain their original positions when the strain was removed. Had a tough, impervious and tenacious rock like a diabass been employed, the writer ventures to assert, replacement would not have become necessary in our day and generation, to say the least.

Resistance to abrasive action. — That the power of any stone to resist the abrasive action of wind-blown sand and dust may in certain situations be an item worthy of consideration is not generally realized. The amount of actual wear to which a stone in the walls of a building is exposed from this source is naturally but slight in comparison to that to which stones in walks and sills are subject from the friction of passing feet. Nevertheless, it is sufficient in many instances to become appreciable after the lapse of many years. There is now on exhibition in the National Museum at Washington a plate of glass formerly a window-pane in the light-house at Nausett Beach, Massachusetts. This was so abraded by wind-blown sand during a storm of not over forty-eight hours' duration as to be no longer transparent and to necessitate its removal. The grinding is as complete over the entire surface as though done by artificial means. This same process is going on, though in a greatly lessened degree, in all our city streets where the wind blows dust and sand sharply against the faces of buildings. The impact of these small particles is not sufficient to perceptibly wear away the fresh stone within a limited time, but it may often be sufficient to crumble away the small particles already loosened by atmospheric action and expose new faces to be acted upon. Professor Egleston states that in many of the church-yards in New York City the effects of this abrasive action can be seen where the tombstones face in the direction of the prevailing winds. In such cases the stones are sometimes worn very nearly smooth, and are quite illegible from this cause alone. Illustrations of the mistake in laying soft and friable sandstones for walks and steps are so numerous I hesitate to touch upon the subject at all. At the present moment the most pronounced case in mind is that offered by the old flight of stone steps (lately removed) leading up to the western entrance of the Capitol building at Washington. These were of a soft sandstone and while they might have answered well for a private building had become worn and hollowed from the daily friction of thousands of footsteps to a very marked degree, the front edge of the tread being in some cases lowered fully an inch below its original level.

As to the commonly employed methods of testing: as a matter of fact no tests are now systematically made with a view of ascertaining the absorptive properties and resisting powers of any stone to the action of frost, although these are, as I have already noted, the most important qualities. In testing the absorptive powers, the methods adopted by both General Gillmore, at Staten Island, and Professor Winchell, at Minneapolis, were substantially as follows: well-dressed cubes from one to two inches in diameter were thoroughly dried, and after cooling weighed, and then immersed in water for periods of several days. They were then removed, the surface-water removed as quickly as possible with bibulous paper and the specimen again weighed; the increase in weight, of course, representing the weight of the absorbed water. In stating the result the increase was always designated in the form of a fractional part of the entire weight; thus if a cube weighing 300 grains dry weighed 301 when saturated the ratio was expressed as $\frac{1}{300}$. This method when carefully carried out in all its details seems sufficiently accurate. Care needs to be exercised in drying to expel all previously absorbed water; and certain authorities have gone to the trouble of immersing the cubes under a bell-glass and then exhausting the air, to ensure complete saturation. This is an unnecessary refinement of methods since no stone is subject to anything like such conditions either in its natural bed or in the walls of a building.

Obviously, the best method for ascertaining the ability of a stone to resist the action of frost is to actually expose the blocks when saturated to freezing temperatures, and then, after several repetitions of the freezing and thawing process, to note by weighing the actual loss by disintegration, or, better yet, the loss in strength. Unfortunately, this cannot at all times and all places be done, and artificial methods must be resorted to. Brard's process, as modified by M. Héricart and Thurg, consisted in boiling the stone to be experimented upon for half-an-hour in a saturated solution of sulphate of soda (glauber salt), and then allowing it to dry, when the salt taken into the pores of the stone crystallized and expanded in a manner supposedly similar to that of water when freezing. This process is now practically given up, as experiment showed that the salt exercised a chemical, as well as mechanical action, giving results somewhat at variance with those of freezing water. Nevertheless, the tests made by Mr. C. G. Page, in 1847, with reference to the selection of stone for the Smithsonian Building at Washington are sufficiently instructive to be noticed here. The samples operated upon, it should be stated, were cut in the form of inch-cubes. Each cube was immersed for half-an-hour in the boiling solution, and then hung up to dry; this performance being repeated daily throughout the four weeks that the experiment lasted. The results obtained were as follows:

	Specific Gravity	Loss in weight, in grains.
Marble, close-grained, Maryland.	2.834	.19
Marble, coarse, "Alum Stone," Md.	2.857	.50
Marble, blue, Md.	2.613	.34
Sandstone, coarse, Portland, Conn.		14.36
Sandstone, fine, Portland, Conn.	2.583	24.93
Sandstone, red, Seneca Creek, Md.	2.672	.70
Sandstone, dove-colored, Seneca Creek, Md.	2.486	1.78
Sandstone, Little Falls, N. J.		1.58
Sandstone, Little Falls, N. J.	2.482	.62
Sandstone, coarse, Nova Scotia.	2.518	2.16
Sandstone, dark, Seneca Aqueduct, Md.		5.60
Sandstone, Aquia Creek, Va.	2.230	18.60
Granite, Port Deposit, Md.	2.609	5.05
Marble, Montgomery Co., Penna.	2.927	.35
Marble, blue, Montgomery Co., Penna.	2.699	.28
Soft brick.	2.211	16.46
Hard brick.	2.294	1.07
Marble (coarse dolomite), Pleasantville, N. Y.	2.86	.91

Results to which I wish to call especial attention are those obtained on the red sandstone from Seneca Creek, Md., and that from Aquia Creek, Va. The first of these, with a specific gravity of 2.672, or a weight per cubic foot of 167 pounds, lost by disintegration but .70 grains. This was the stone ultimately selected for the Smithsonian, and the building as a whole is to-day probably in as good state of preservation as any of its age in the United States. The second stone, with a specific gravity of 2.23, or a weight per cubic foot of but 139.37 pounds, and which lost 18.6 grains, is the one used in the construction of the old portions of the United States Patent Office, Treasury, White-House, and Capitol Buildings. The stone is so poor, and disintegrates so badly, that only repeated applications of paint and putty keep them in anywise presentable. The results obtained with hard and soft brick are even more striking: the one weighing at the rate of 138 pounds per cubic foot losing 16.46 grains, while the harder brick, weighing 143 pounds, lost but 1.07. If anything can be learned from the series, it is that, with substances having the same composition — those which are the most dense, which are the heaviest, bulk for bulk — will prove the most durable. The results obtained on the coarse and fine blocks of Portland sandstone suggest, at least, that water would freeze out of the coarser stone, and, therefore, create less havoc than in that of finer grain, a probability to which I have already referred.

The pressure-tests that have been made in times past have, for purposes of future reference, been deprived of a large share of whatever value they might otherwise have had by the unsystematic manner in which the experiments were carried out. General Gillmore has shown, in his admirable series of experiments upon cubes of varying sizes, that "at least within certain limits, the compressive resistance of cubes per square-inch of surface under pressure increases in the ratio of the cube roots of the sides of the respective cubes expressed in inches." So far as I can learn, however, these

results are wholly ignored, each architect or engineer working on an independent basis, testing blocks of such size and shape as are sent him, or are most readily obtained. Gillmore, as above noted, used two-inch cubes. The architect of the Congressional Library Building proposed, I believe, to use one-inch cubes. Tests on stone for the Philadelphia City-hall were made on blocks varying from six to seven inches in diameter; indeed, the size of the block seems in many instances to be limited only by the capabilities of the testing-machine, and, in the report of the last case alluded to, we find record of three blocks that sustained the maximum of load of the machine (800,000 pounds) without perceptible injury. Still another discrepancy lies in the fact that, in advertising for blocks to be tested, no mention is made of the manner in which these blocks are to be prepared. A small cube trimmed out with hammer and chisel from necessity becomes filled with incipient fractures, and such a block may crush under considerably less pressure than a really weaker stone which has been sawed to proper size and retains its natural strength. Still further, the reports of such tests are often wholly invalidated through the ignorance of whoever may be in charge of the exact nature of the material experimented upon. All finely fragmental siliceous rocks, whether composed wholly of grains of quartz, or quartz, feldspar and mica, whether with siliceous, ferruginous, or calcareous cements, are classed together as sandstone, with no further description than a reference to color. All crystalline siliceous rocks, including granite, gneiss, mica-schist, and even trappean rocks, like the diabases, norites, diorites, and kersantites, are considered as granites. All calcareous rocks, whether magnesian or otherwise, are, if of good color, marbles; or, if of poor color, and finely compact or amorphous, merely limestones. It is obvious that such a classification is not sufficiently precise to be of value.

I think there can be no doubt but I have shown that, as first stated, the problem is a difficult one, and also that the few efforts made toward its solution are of little value, except as showing what methods are to be avoided in the future. It remains to be seen if anything better can be suggested. I will briefly outline a scheme such as been gradually shaping itself in my mind for several years past. The subject has been very forcibly impressed upon me in connection with my duties as curator in the National Museum, and more particularly when preparing for exhibition the extensive building-stone collection made by the Tenth Census, a partial duplicate of which was also prepared under my direction for the American Museum in New York City.

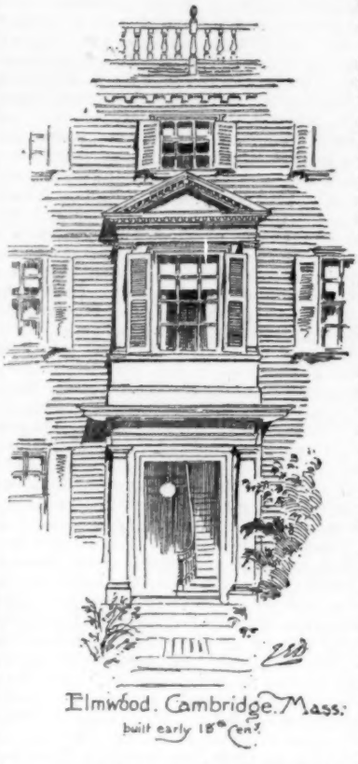
Assume, first, that the stone to be examined is designed for use in the exterior walls of a building, subjected to all the vicissitudes of our Northern climate, and to only such conditions of pressure and strain as exist in any of our government buildings.

All things considered, it seems best that the experiments be conducted on two-inch cubes. These should be prepared by sawing and grinding, never by hammer and chisel. After drying at a temperature not exceeding that of boiling water, the ratio of absorption should be determined by complete immersion for a period of not less than forty-eight hours; the method, as followed by General Gillmore, is sufficiently accurate. The cubes should then be repeatedly frozen and thawed while in a saturated condition, and the amount of disintegration ascertained by careful weighings. If the stone is a fragmental one (sandstone), and it is found to suffer appreciable disintegration by freezing, it may be well to ascertain the loss in strength as well. This can be done by crushing the cubes after freezing, and while still saturated, and also freshly-prepared cubes not otherwise tested. The freezing can be brought about artificially by means of such apparatus as is used in making artificial ice.

The question of durability of color and resistance to atmospheric action can be settled only by chemical and microscopic tests. The condition of the iron, whether in the form of sulphide, carbonate or protoxide, is the main question to be considered. A little can, perhaps, be learned by submitting samples to the action of artificial atmospheres, samples being suspended for several weeks under bell-glasses charged with acid fumes. The resistance to the effects of carbonic acid can, perhaps, be best determined as Professor Winchell has done, by placing the samples in a basin of water through which carbonic-acid gas is kept bubbling. This test is scarcely necessary, except upon calcareous rocks or fragmental rocks with calcareous or ferruginous cements. The determination of the modulus of elasticity as made by processes now in vogue is apparently sufficiently accurate. When, as may sometimes happen, it is desired to ascertain the relative powers of resistance to wear, as in pavements, or from wind-blown sand, this can readily be done by means of a carefully-regulated sand-blast, such as is used in the Tighlman process of stone-carving. This property might almost equally well be learned, however, by observing the manner in which the stone worked under the chisel.

A very essential item in this connection is that the tests be conducted under the direct supervision of one thoroughly acquainted with the mineral and chemical composition of rocks, their structure, origin, mode of occurrence, and characteristic manner of weathering. A purely theoretical knowledge is valueless, and only one who has devoted years of time to the work, both in the laboratory and in the field, can hope to deal with the matter successfully. One great difficulty with all such work is that we are prone to expect too much, to obtain immediately results which, in the ordinary course of events, can be brought about only by months, and perhaps years, of careful observation, study and experiment.

THE METROPOLITAN MUSEUM OF ART.



THE reopening of the Metropolitan Museum in December was an event of decided interest in the art-world. The new wing having doubled the space at its command, the Museum was able to make an imposing show of its valuable belongings, supplemented by some important loans.

The casts of Assyrian and Greek sculpture which decorate the fine hall into which the main entrance conducts the visitor are a welcome acquisition, though as yet not sufficient in number to form a representative collection. The munificence of Mr. Henry G. Marquand, one of the Trustees, has, however, provided means for the completion of this department, and casts of the most important sculptures in European museums have been purchased, and will be displayed as soon as space can be found for them. The collections of Phœnician, Greek, Roman, Venetian, and Florentine glass, also given by Mr. Marquand, together with that presented by the late James Jackson Jarves, and the ancient glass from the Cesnola collection, are now placed in one room, and form a most important group, said to be equal to any in the world. Be this as it may, there is here a wealth of beauty in form and color which is inexhaustible. In the same hall is a fine lot of rare and beautiful old laces from Europe and the East, given by the late Mrs. John Jacob Astor and Mrs. R. L. Stuart, and costing many thousands of dollars. They are placed, with the MacCallum collection of laces, in swinging frames on iron standards. The Museum has lately received a valuable collection of Egyptian antiquities, including many sarcophagi and mummies, with numerous smaller objects, found by Maspéro in 1886. These, or a number of them, are of persons of high rank and their burial-cases are richly decorated, the colors on some being as bright and fresh as if laid on yesterday. The mummies and their double cases have been most ingeniously and advantageously arranged, separately and in different positions, so that (aided sometimes by mirrors) one can see not only all around and underneath, but inside the cases. As these interiors are often also highly ornamented, this is a distinct aid to examining them. Near these splendid and curious coffins, in some of which fair and noble ladies — princesses, perhaps — have lain embalmed for tens of centuries, are frames filled with embroideries and textile fabrics found in the Fayûm, dating from the second to the eleventh centuries of our era, many of them elaborately patterned, and with colors still in excellent preservation. The Ward collection of Assyrian and Babylonian antiquities, such as clay-tablets, seals, cylinders, inscribed clay barrels, gold and other ornaments and bronzes, has also been acquired and is now on exhibition. An alcove of the lower hall is devoted to wrought-iron and other metal-work, and there are a number of antique musical instruments, a huge, finely-carved clock of English work, dated 1640, two large cabinets, one inlaid with Oriental porcelain and various pieces of carved wood, including some fine specimens of Frullini's work. The great main hall of the older portion of the building is to be devoted to the Willard collection of architectural casts, and a large inscription to this effect has been put up. A number of them have arrived, and are stored in the Museum, and it is hoped that they will be placed in position during this winter. In the meantime the floor-space of this hall is vacant, but on the faces of the north and south galleries have been placed casts from the frieze of the Parthenon, and at one end are hung some old tapestries, opposite which Makart's enormous picture of "Diana's Hunt," a lately acquired gift, lends its rosy flesh-tints and sumptuous color to the spacious hall.

The Huntington gallery of memorials of Washington, Franklin, and Lafayette is an interesting place, where are arranged representations and all kinds of souvenirs of these distinguished patriots. The paintings, busts, statuettes, medallions, pottery, prints, medals, autographs, and many other objects here displayed serve to recall their deeds and vivify their memories. The Lamborn collection of American antiquities is composed of antique and comparatively

modern idols and fetishes worshipped by the aborigines of New Mexico, and objects from Mexico, Central America, Peru, and elsewhere. Another room is devoted to gems and objects in precious metals, and contains the Johnston-King collection of ancient gems; the Curium treasures from the Cesnola collection; the Lazarus collection of miniatures; cases of coins, watches, snuff-boxes, and silverware; and the Maxwell Summerville collection of engraved gems, pastes, cameos and rings. This is an exceedingly valuable and beautiful gathering, and, by the kindness of the owner, will remain on loan with the Museum for several years. Around the walls of this — the "Gold" room — are hung some magnificent Persian rugs, old tapestries, and pieces of Spanish and Venetian leather, French embroidered silks and Genoese velvets, loaned by Mr. Marquand. The Vanderbilt collection of drawings by the old masters, with a large number of similar sketches and studies given in 1887 by the artist Cephas G. Thompson (since deceased) has been hung in a long gallery on the second floor, with several frames of etchings by Haden, Whistler, Jacque and others, given by W. L. Andrews. An alcove leading from the gallery holds the Hadden collection of civil and military decorations and orders, and here, also, have been hung the water-colors by William T. Richards.

The most popular of the many good things shown seems to be, as usual, the modern paintings, two galleries being filled with the pictures given by Miss Wolfe; two with the other modern works, including such well-advertised canvases as Rosa Bonheur's "Horse Fair," Meissonier's "1807," Detaille's "Defence of Champigny" and Piloty's "Thusnelda," which are the property of the Museum; and one with its old masters, including the large and important example of Sir Joshua Reynolds — "The Hon. Henry Fane and his Guardians" — given by Mr. Junius S. Morgan. Then there is a gallery full of loaned modern paintings, and another — the Mecca of many a pilgrim of art — holding a splendid collection of old masters, the like of which was never seen in this country before, and which was given to the Museum, since its reopening, by Mr. Marquand. This makes seven galleries of pictures in all, and, in round numbers, five hundred paintings. Mr. Marquand has generously despoiled his beautiful house of its choicest paintings and sent them here. This gentleman, and his name should be dear to all true art-lovers, is one of the very few American collectors — Mr. Quincy A. Shaw, of Boston, is another — who cares to gather any pictures but modern ones. He acts in the spirit of those words from one of the discourses of Sir Joshua Reynolds, which are inscribed on the walls of England's National Gallery: "The works of those who have stood the test of ages have a claim to that respect and veneration to which no modern can pretend."

It is an ungracious thing to criticise gifts, but if part of the large sums spent upon some of the pictures of the day (and of the day only) which have been presented to the Metropolitan Museum, had been used to buy good, not necessarily "important," examples of the work of the great artists of former centuries, it would be much better for everybody. The chief glory of the Marquand paintings is the portrait of James Stuart, Duke of Richmond and Lennox, by Van Dyck, which hangs at one end of the gallery. It is a life-size, full-length representation of a pleasant-faced young cavalier, with long, curling, yellow hair, who wears a black dress with white silk stockings, and stands easily before us, one hand resting on the head of a fine greyhound which looks up into its master's face. Van Dyck painted half-a-dozen portraits of this nobleman, one (a half-length) being now in the Louvre, and introduced the dog in two or three of them. The story is that the youthful Duke when travelling on the Continent was preserved from assassination by this dog, which slept in his chamber and aroused him from his sleep. James Stuart was a favorite courtier and faithful adherent of Charles I, whose father and his were cousins, and received many favors from the King, which he well repaid. He was hereditary Lord Chamberlain and High Admiral of Scotland, was made a member of Charles's Privy Council when scarcely twenty-one, and appointed Lord Steward of the royal household and Warden of the Cinque Ports. He loaned Charles large sums of money to help his failing cause, and his two younger brothers both entered the royalist army and were slain. He lived a few years after the death of the King, at whose execution he was present (it is told that he offered to suffer death in his cousin's place), and was allowed the privilege of burying him. After this, he retired into absolute privacy and died, it is said, of the gradual effects of grief, in 1655, being then only forty-three years of age. This portrait formerly belonged to Lord Methuen, in whose collection at Corsham Court, it was seen and described by Dr. Waagen over thirty years ago, and has been engraved by Earlom. It displays all the dignity, ease and refinement which are associated with Van Dyck's courtly sitters, and is a superb example of his powers as a portrait-painter. Some one has truly said that we cannot judge how much of the romantic interest and sympathy with which the subsequent generations have regarded the cause of the Stuarts is owing to the pictures of them and their supporters by Van Dyck. The beautiful hound in this portrait is painted as carefully as his master, his affection towards whom being admirably represented. An excellent portrait of a lady is also by Van Dyck, and by Rubens there is an early work, "Pyramus and Thisbe," and a good portrait of a man. Of the Flemish school, also, we find a small and minutely finished "Virgin and Child," attributed to Jan Van Eyck.

There is a masterly little portrait of the child Don Batthasar, by Velasquez, and a larger one of the Doña Maria Anna, a stolid-looking young woman, with an enormous head-dress; and one other Spanish picture, a "St. Michael and the Devil," warm and bright in color, by Zurbaran. Of the English school, there is a charming portrait of Lady Carew, tender and sweet, by Sir Joshua Reynolds; a fine "Young Girl with Cat," by Gainsborough; and a warm golden-brown picture by Turner, showing the little port of "Saltash." This was painted about 1812, and Mr. Ruskin praises it as an example of perfect truth in the painting of water. Then we come to two large landscapes by Constable, "The Valley Farm" and "The Lock," both subjects which the artist has made familiar by other renderings of them; a good landscape by "Old" Crome, and a beautiful small shore view by Bonington. Only one French artist is represented — Prud'hon, by a sketch for his large painting of the "Assumption" in the Louvre. This once belonged to William M. Hunt. Masaccio is the single Italian present, to him being ascribed a "Female Head," with a man in a curious red hat, looking through a window, the whole in the delightfully quaint early Florentine style of portraiture. The Dutch school is shown in portraits, not one of which is without its good qualities, and some being excellent, by Juriaen Ovens; Hoogstraten (a man and woman on the same canvas); Franz Hals (two pictures), Janssen and Terburg; in landscape, by Ruysdael and Teniers; and in *genre* by Teniers, with two copies from Bassano, Netscher, Zorg, and an exquisite small painting of a "Young Women opening a Casement," by that rare and little-known master, Van der Meer of Delft. This is one of the gems of the gallery, and it would be an incredible monster of a collector who could have congratulated Mr. Marquand upon owing it without envying him.

An "Adoration of the Shepherds," the authorship of which is given to Rembrandt, hangs near the grave head of a man in a black hat, from Lord Lansdowne's collection, by the same great artist, two of whose best portraits are also here. These are the portraits of Van Beresteyn, burgomaster of Leyden, and his wife, which Mr. Henry O. Havemeyer lends to the Museum. Discovered a few years ago at a sale of the old portraits belonging to the Beresteyn family, in Holland, they were afterwards brought over by Messrs. Cottier & Company, who sold them to Mr. Havemeyer. They are magnificent examples of the great Dutch portrait-painter, and are in admirable condition, dated 1632, which, with the master's signature, is plainly to be seen on each. The figures are of two-thirds length, life-size. These plain, shrewd, honest people, this man who has doubtless made a substantial competency in his business, and his careful spouse who has helped him to economize it, stand before us made alive again by the marvellous brush of Rembrandt.

Van Dyck's patrician at the other end of the room and Rembrandt's bourgeois at this, are the select ones of this goodly company of pictures. It is perhaps worth noting how nearly alike, and how few and sober are the hues which the painters have used on these portraits. Black, white and yellow — but what rich harmonies of color are the result.

The list of old masters is closed by a "Christ before Pilate" (in distemper) and an "Ecce Homo," both attributed to Lucas Van Leyden, and an interesting portrait by a master common to all the schools, who has produced innumerable pictures of all kinds — good, bad and indifferent. His name is "Unknown," and this time he is Dutch. All these paintings, save the two Beresteyn portraits, have been presented by Mr. Marquand. Several of them, besides the Van Dyck, are from the Methuen collection.

The loaned modern pictures, most of which are lent by that well-known collector, Mr. George I. Seney, comprise Stewart's "Hunt Ball"; Laurens's "Repudiation of Bertha, wife of Robert the Pious"; Delacroix's magnificent sketch for his "Expulsion from Eden" (belonging to Mr. Havemeyer); Isabey's "Blessing the Hounds," an important Leys; Gérôme's "First Kiss of the Sun" (on the Pyramids); two examples of Cazin; Boughton's "Tam O'Shanter," and many more.

From this review it will be seen how many varied attractions New York's Museum now possesses, and it is to be hoped that others, among her many rich men, may add their contributions to those so generously made by some of their fellow-citizens.

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

THE ARION CLUB-HOUSE, PARK AVE. AND 59TH ST., NEW YORK, N. Y. MESSRS. DE LEMOS & CORDES, ARCHITECTS, NEW YORK, N. Y.

[Helio-chrome, issued only with the Imperial Edition.]

GOTHIC SPIRES AND TOWERS, PLATES 39 AND 40. — ST. MARY MAGDALENE, CHEWTON-MENDIP; ST. PETER'S, HARROLD; ST. ANDREW'S, BILLINGBOROUGH; SS. PETER AND PAUL, EASTON-MAUDIT, ENGLAND.

[Issued only with the Imperial Edition.]

THE AGE OF FRANCIS I, PLATE 2. — THE TOMB OF THE CARDINAL D'AMBOISE IN THE CATHEDRAL, ROUEN, FRANCE.

[Issued only with the Imperial Edition.]

CHURCH OF ST. GILES, LURAY, VA. MR. GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

THE walls are to be built of native limestone, face-work on both inside and outside, and roof supports of undressed timbers so far as possible; and it is the intention to finish the whole interior in as simple a manner as possible consistent with churchly effect. The cost of this chapel will be about five thousand dollars, and it is intended to be erected on the grounds of the Luray Inn, principally for use in the summer by guests thereof.

WAREHOUSE FOR F. L. AMES, ESQ., LINCOLN STREET, BOSTON, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

"THE TALLEYRAND," BAR HARBOR, ME. MR. DE GRASSE FOX, ARCHITECT, PHILADELPHIA, PA.

DESIGN FOR A PLASTER CEILING BY MR. C. J. BROOKE, PHILADELPHIA, PA.

BURNING OF THE CHICAGO OPERA-HOUSE. — HOW CHARTERS FOR OFFICE-BUILDINGS ARE OBTAINED. — HOW AN "ABSOLUTELY FIREPROOF" THEATRE IS BUILT. — AN APARTMENT-HOUSE FIRE. — PROPOSED ARCHITECTURAL INSTRUCTION AT THE ART INSTITUTE. — THE OUTLOOK. — MR. EHRICH'S COLLECTION OF DUTCH AND FLEMISH PICTURES. — THE VERESTCHAGIN PAINTINGS. — SUNDAY OPENING AT THE ART INSTITUTE. — LIBBY PRISON.

AMONG the numerous blazes that are constantly occurring, Chicago has, within the last few months, been the victim of two, which, with a slight change of hour or circumstance, might have been catastrophies. The first occurred in the early part of December at the Chicago Opera-house. The performance here had scarcely been finished fifteen minutes, and the actors were still in the building, when an alarm of fire was given, and although this establishment is advertised and described on every programme and poster as being "the only absolutely fireproof theatre in the city," still in less than an hour all the auditorium was a complete wreck either by fire or water. This opera-house is not a building by itself, but occupies the lower stories of the court of a large office-building. The reason for such a location is that the laws of the State of Illinois are such that a charter to build an office-building pure and simple, cannot be obtained. As a result all sorts of expedients are resorted to, in order to obtain charters for those syndicates that desire to build such buildings, and probably the large majority of them are incorporated as safety-deposit companies, although the safe-vault, if it exists at all, consists of a closet in which is stored a trunk containing a watch or two. Owing to this law a syndicate was formed to build an opera-house, although the opera-house itself was but a small part of the plan since the building is ten-stories high, while the theatre, as mentioned above, only occupies the space in a few lower stories that above becomes the court, from which many offices obtain their light. The office-building is undoubtedly fireproof, and possibly it was originally intended that the theatre should be so also, but it certainly did not prove such when the fire broke out. This fire, which started in an upper gallery, was apparently due to some defect in the electric-light plant, but the exact how and why does not seem to be really known, although numerous positive theories are not wanting. But, as is usual in theatre fires, in an incredibly short time the building was filled with smoke. Actors fled leaving their wardrobes a prey to the flames or the deluge of the fire-department. The inaccessibility of the building obliged the firemen to work slowly, but the amount of damage caused by the flames was small in comparison with that caused by the water, since every nook and corner was soaked. Although the money-loss was considerable, the work of repairs was at once commenced, and the theatre was again in full blast within three weeks. It is noticeable, however, that the legend "absolutely fireproof" has now been changed to "fireproof"; but it would seem to be extremely questionable if even such an announcement should be permitted by the authorities, since, in the ordinarily received sense, the theatre is evidently not fireproof, and such an advertisement is only calculated to deceive the people, and in case of another accident might lead to more disastrous results than if the actual truth were not concealed, and each one was on his guard against a panic. Had this fire occurred only a few minutes earlier the casualties must have been numerous, and the whole city congratulates itself on the fact that such a disaster did not take place Upon examination by architects it was found that this so-called and much advertised "absolutely fireproof" theatre had an attic which, with the exception of a few girders, was entirely of wood, just the same as the cheapest theatre in the city. Moreover, the gallery was practically a wooden construction, owing to the fact that from the original gallery built on iron framework a sight of the stage was absolutely impossible from many parts, and in order to remedy this a wooden construction was built on top of the old gallery until the desired sight-lines were secured; all of which seems to have resulted in something very inflammable. The repairs, so far as known to your correspondent, seem to have been of about the same character as the old construction; but still the building is advertised as "fireproof."

The second escape that we have had from a calamity was a fire in one of the highest, largest, and finest apartment-houses on the North Side. The building, seven stories high, constructed especially with a view to please the eye, with a stone front, elaborate entrance, marble wainscoting, natural-wood finish and hard-wood floors in the apartments, but otherwise of a rather flimsy construction, caught fire in the attic one morning about seven o'clock. Many of the occupants were still abed: they hastened to arise, however, and several of them went forth in garments scarcely adapted to a cool winter's morning. The fire had made considerable progress when first discovered, and this attic, being occupied as store-rooms by the occupants of the flats below, was filled with much that was light and inflammable, so that it burned right merrily. Although the fire-engines were promptly on the ground, the height was so great that even "siamesing" a stream from two engines had little effect, and it was necessarily some time, comparatively speaking, before the proper long ladders, hose, etc., could be arranged to work at such a great height. By this time the fire had worked down, so that the upper story was smoking vigorously, but, when the streams once got to work, the deluge was such that the fire soon succumbed, but the drenching with dirty water that the apartments below received as the liquid gradually filtered through from one floor to another was something appalling. One person was injured by jumping from a window, but otherwise there were no casualties. Had the fire occurred lower down, so that it could have taken advantage of the elevator-shafts and worked both up and down, there would in all probability have been one less "elegant apartment-building" in the city; while, had the stairways been cut off, as probably would have been the case, the loss of life in such a high building might have been very serious.

The subject of an architectural school, or, at least, some kind of an extended course in architectural drawing at the Art Institute, is receiving considerable attention in the daily papers, and eventually something may come of it, although at present it does not seem probable that any very definite action will be taken for some considerable length of time. This agitation has been brought about principally by the generous action of Mr. Robert Clark, who has given the Chicago Architectural Sketch Club the sum of one thousand dollars, the interest of which is each year to be devoted to medals for the best work, and he has stated that he will give considerably more if a school is started. Several other gentlemen have intimated a willingness to imitate Mr. Clark's example, so that when the matter is brought to a head, funds will probably not be lacking.

The outlook for building the coming season, if one may now judge by what architects say, is that there will be fully as many pieces of work as last year, but the number of extremely heavy and large constructions, especially office-buildings, appears to be somewhat limited: there will, however, be several important buildings of a semi-public character, such as libraries, that will undoubtedly be commenced during the next twelve months, while an unusually large number of fine residences are already on the boards.

During the past few months Chicago has been favored, as never before, with art displays in all directions and of all kinds and it is extremely remarkable to note the extraordinary growth of popular interest during the past year alone, in all art questions. We are getting so fully satisfied with our own appreciation of art, and this artistic spirit is so rapidly growing and developing in every one that it seems a perfect matter of course that the Verestchagin collection should come here direct from New York before being exhibited at the other Eastern cities.

The first important display of the season was a collection of old Dutch and Flemish paintings belonging to Mr. Louis Ehrich. This exhibit contains some two hundred paintings, and although there are few canvases by the great masters, still it contains many extremely good things of this period and gives as perfect an idea of the art of Holland and Flanders as many of the smaller museums of Europe, and as an exhibit of these schools, which had never before been at all fully exhibited here, it attracted great attention. Especially on the free days the rooms were crowded.

The Dutch pictures were followed by a small collection of the old Italian masters, which in their turn were much admired and now they have given place to the most remarkable exhibition ever yet shown to the Chicago public at the Art Institute, in the collection of the famous Russian, Verestchagin. This was opened to the public on February 1, and has ever since been thronged.

To the disappointment of many the artist, himself, does not come to Chicago, still the pictures were hung by his regular assistants who have literally taken possession of the Institute. The noble Greek and Roman gentleman (in plaster) have been unceremoniously hustled off into back rooms to allow for the proper display of this collection, while the few casts that could not be moved have been covered with drapery until entirely concealed. The manner of arranging the

exhibit savors possibly a little of the panorama with its little tricks of effect, but the result is so very satisfactory as scarcely to make one wish that it were otherwise. The huge rugs, duplicated for the artist from those now in temples in India, are draped upon all sides with bits of Oriental armor, so that the servants in Russian costume, and the tea served from a samovar does not possibly seem entirely out of place with the surroundings.

If Verestchagin excelled in no other department he certainly would always be marvellous as a painter of architectural subjects and his views of the Taj, and some of the mosques of India together with his scenes of the Kremlin, at Moscow, are wonderful revelations of the beauty of those monuments. At the same time that this collection is before the public at the Art Institute, the Chicago Artists' Club is giving an exhibition of the work of its members during the past year, and the result is certainly a credit to those painters who have their studios in Chicago.

Besides these various displays, there have also been in the course of the winter several fine exhibits in the salesroom galleries, any of which would have been considered a treat a few years ago. Then, not only are the painters busy but the sculptors' studios all seem unusually full of work of a high order of merit, and bronze statues and bas-reliefs are now being cast here for some of the most important sculptural work in the West.

As mentioned some time since in one of these letters, it was decided to try the plan of having Sunday opening of the collections of the Institute. This has now been in operation for nearly three months, and the results have been most satisfactory, and in some respects surprisingly so, for the experiment has been tried of exhibiting without any railing or signs of "hands off," and up to the present the authorities have had no cause to regret this step. In one point, however, there is possibly a little disappointment: it was hoped that the poorer working-classes would especially take advantage of the day and the fact that no admission-fee was charged. Such, however, does not appear to have been the case, for the crowd consists mainly of the rather well-to-do class, who possibly cannot, but certainly *think* they cannot get away from business upon a week-day, so that the visitors are generally well-dressed and well-behaved.

For some time a number of Chicago capitalists have been negotiating with parties at Richmond, Va., for the purchase of the old and historic Libby Prison, and the business has now been closed. The building will at once be taken down in sections, each carefully numbered and shipped to Chicago, where it is to be re-erected and used as a war-museum. Whether it will be a financial success or not, architects will be decidedly interested to watch the construction as it proceeds, for, of all the curious building operations at Chicago, this will assuredly be the most remarkable one during the coming six months.

NEW·YORK·

THE DAWNING OF A BETTER TIME. — RETROSPECTIVE. — THE WORK OF THE MAGAZINES. — THE GROWTH OF SOCIETIES. — THE WILLARD COLLECTION OF CASTS.

THAT there are better days in store for the profession, and that we stand to-day upon the threshold, none but the hardened pessimist can doubt. The tendencies shown in architectural discussions both public and private, the positions taken by the daily papers and by the more intelligent laymen regarding our work and our position, all confirm the progress made within the last dozen years and are assuredly full of promise for the future.

The great trouble in our past history has been such as is inevitably associated with the growth and development of any new and far-reaching factor in our already complex civilization, and the peculiar position of the architect making him both artist and engineer, both judge and advocate, has helped to retard our progress towards assured recognition. The architect of but a short generation ago had to justify his very right to exist, and his clients came to him, if they came at all, with an uneasy consciousness that they were indulging in an extravagance; deep down in their minds lurked analogies, drawn perhaps from political campaign literature, anent republican simplicity and the effete despotisms of Europe. The architect seemed to them in someway associated with riotous living, with the Baron Haussman and the Third Empire. This attitude on the part of the client was fostered and prolonged, indeed it still lives to a degree, by a variety of influences actively working within the profession itself. The first American architects, to except the very few notable but isolated instances in our earliest history, began their careers well within the memory of men now living and practising; before their time, architect and master-builder were practically synonymous terms and had identical functions. The only training then attainable was to be had only in Paris or in London, and with the influences of that training and, perhaps, some European travels fresh upon him our architect was thrown upon a community more self-centred, more intent upon the immediate dollar and less open to the softening influences of the artistic amenities of life than any society of equal worth ever known. They were obliged to battle for recognition almost alone, mistrusted by their nominal associates the master-builders, distrusted by the public and stigmatized as mere theorists. In spite of all they triumphed, and not the least of their achievements was the training of scores of devoted and enthusiastic younger men, inspiring them with their own love for their chosen profession, and instilling into them by precept and example the determination to do the best that was in them to do.

But both master and pupil felt the influences of environment, and, of necessity, emulated the reed rather than the oak in their relations with the public. Under the necessity of compromising with their ideals (let us hope not with their consciences) in order to meet the demands of their clients, who did not understand their position and grudgingly admitted their utility, the architects had to throw over the traditions learned abroad, or growing up out of the building trades had no traditions of professional life, and thus lacking a clearly expressed and definite purpose all their attempts at united action were at first feeble, halting and inefficient. There was little besides the individual effort, and the personal example of isolated enthusiasts to recreate a body of traditions that would be adapted to their surroundings and would carry the force of law both within the profession itself and to the wider public. The marvel is that so much has been done by so small a group in so few years.

To-day the battle is practically won, and hereafter we shall look back upon the fusion of the American Institute of Architects with the Western Association as marking the close of the era of the struggle for existence, and the opening of the new era of assured recognition.

That this is not too hopeful a view to take may be shown by many instances, some of the most conclusive of which are marked by the entirely unconscious acceptance by the public, and by the architects of tenets that were not long ago disputed.

As slender straws showing this unconscious drift, yet convincing to any one looking back, it may be mentioned that the *names of the architects* appeared in the New York daily papers six times within a week, in connection with buildings built or to be built; that in the new and progressive districts about West End Avenue and the Riverside Drive, the names of the architects are commonly used by the real-estate agents to give added value to the really very cleverly designed speculative houses (as distinguishing them from the houses built to be occupied by the builder). During a long morning's stroll through this same district, only one watchman was found, though there may be others, who did not know who designed the houses he was in charge of, and he developed unmistakable traces of a blush, obviously at his lamentable ignorance.

To turn to more serious signs, let us note, with a word of grateful acknowledgment, the splendid services rendered to the profession by the *Century Magazine* and Mrs. Van Rensselaer, and by several other well-known periodicals. One need not doubt their entire sincerity, and yet see that their talents are turned in our direction in answer to a demand on the part of their readers.

The Architectural League particularly, and the many other kindred associations, sketch-clubs and T-square clubs springing up and flourishing in many of the larger cities, bear this same unconscious testimony to the fact that the position of architecture is recognized, and the period of struggle is being lost sight of.

The complex grows out of the simpler form, and the League thus shows its progressive tendency in that it is not simply an association of architects or draughtsmen, but has brought together the followers of architecture and of the allied arts. The election at the last annual meeting of Mr. Russell Sturgis as President and Mr. E. H. Blashfield as Vice-President, both being notably representative men, most felicitously marks this blending of kindred pursuits. The League is rapidly increasing in numbers and influence, and it is pleasant to note a growing breadth, earnestness and enthusiasm proportionate to its increasing scope and influence. There is, also, a tendency to give public expression to its opinions upon pertinent questions of public interest in a manly and properly assertive way, as in the protests against the terms of the competitions for the Grant Monument and the city buildings.

There has been in the past rather too little of this collective assertiveness, even where questions intimately affecting rights and duties were at stake. This has been due partly to the lack of fixed traditions, as outlined above; partly, perhaps, to the fact that the quasi-judicial position of the architect, as between the client and the contractor, influences his mental attitude, and leads him to weigh carefully both sides of every question, and to prefer, where rights conflict, the judicial attitude to that of the advocate.

To these same causes may be ascribed the fact that many architects have been surprised to find, and many have yet to discover, what is, nevertheless, true, and that is that the average client has no definite desire to trample him underfoot or to subject him to humiliating conditions, but acts either from simple ignorance of the architect's complex position, or from having been misled by the questionable methods in the practice of other architects, whose pride or whose backs were over-weak. In numerous instances, a temperate explanation of the duties involved, and a firm insistence upon the consideration due, have been accepted by the client in the spirit in which it was offered, and relations of mutual confidence and respect have ensued and continued.

Professor Ware made the interesting announcement at the last League dinner that the first instalment of casts purchased under the Willard Trust had arrived at the Metropolitan Museum, and would soon be on exhibition. It seems that we owe what promises to be a most complete and invaluable collection of casts of architectural works to the efforts of Mr. Pierre Le Brun, who persuaded Mr. Willard to thus dispose in his will of a fortune of some eighty thousand dollars. A commission was named, consisting of the Le Bruns, father and son, and Messrs. Littell and Bloor, to expend this amount in the selecting, purchasing, and placing in the Metropolitan Museum of plaster reproductions of architectural works and details. Mr. Pierre Le Brun has visited all the places in Europe where such casts are to be had, and has succeeded in making a most interesting selection, which includes many subjects not before accessible and other interesting features.

A model of the Parthenon is being made at a scale that will make it about ten feet long and five feet wide, with all the sculptures reduced from the original marbles. This work is in charge of Mons. Chipiez, the well-known French architect and archæologist, who will also superintend the coloring of this model in accordance with the traces of color discovered by his researches. The 120 cases of casts now at the Museum represent the expenditure of only one-quarter of the fund.

What with the bequests of splendid paintings of past and present schools, made by Miss Wolfe, Mr. Marquand and others, this bequest of Mr. Willard's, and the considerable extension of the Museum building, New York will now begin to take the rank her wealth entitles her to, or, at the least, she need no longer blush at her utter insignificance.

THE HUMOROUS SIDE OF COMPETITION. — THE ONTARIO PARLIAMENT HOUSE. — THE TORONTO BOARD OF TRADE BUILDING.

WHAT a capital subject for an incident in "*Martin Chuzzlewit*" would have been "a competition for a public building of some small country-town," were the book being written now. How Dickens would have relished the humor of a dozen or so all-important village authorities — the rector, the wardens, and a few of the richer men of the parish — beaming with self-satisfaction and radiant with complacency as they sit round the vestry-table and pass a resolution of invitation to all the architects of neighboring cities to compete for a fifteen-hundred-dollar school-room. Perhaps the rector — often the only gentlemen in the place — is not always to blame, overruled, as he is often overawed, by the loud vulgarity of a turbulent subscriber. He, poor man, has to submit and share the ridicule that such a company would call down upon itself from the humorous author.

Three invitations of this character have been in circulation recently. When publicly advertised, the invitation is clothed with a certain amount of decency, borrowed from the respectability of the press; but, when sent through the post, the true character of the people the competitor would have to deal with betrays itself. A bit of foolscap-paper, roughly torn off, just large enough to contain the words of the resolution, badly written by an office-boy, enclosed with a note from the secretary of the committee, who signs his surname without initials, as if he were "my lord." Such is the amusing commencement usually.

An invitation that should have a more respectable stamp about it comes from a cathedral-owning town in Ontario. The charm about it is the innocence of the committee, "who will be happy to receive suggestions or plans for proposed alterations to the cathedral, provided they are submitted *free of cost*." This dear committee expects architects to travel three hundred miles, spend a day or so examining and measuring, and then to submit plans and suggestions on the chance of getting a job, "free of cost." In another competition for a $75,000 building, the architect whose plan is approved will be magnanimously presented with a check for $250. For this handsome remuneration he is to supply working-drawings and specification, and the whole will become the property of the committee. This may be considered a pretty good specimen, but yet there is one more, really very beautiful in its conception: a small hospital is required, the cost not to exceed $7,000; the requirements are all that is necessary and that can be put in for the money, but, say the "conditions," "any design showing that this accommodation can be supplied for a less sum will have the preference." The grammar, as well as the sentiment, is truly noble.

At a recent meeting of the Toronto Architectural Guild, the executive committee was empowered to deal with such competitions as it might think fit on its own responsibility, without reference to the Guild, the intention being to instruct these committees "in the way in which they should go." The question was raised as to why it was that the conditions did not ask for a subscription towards the buildings, to be forwarded by competing architects, together with their designs. The tariff question before the Toronto Guild had to be held over from the last meeting on account of press of other business. It was decided that the committee's report, which was read, should be printed and submitted to each member, and a special night appointed for the discussion of the matter. A matter of such great importance deserves and requires some time for its elucidation. Whatever is done must be done unanimously.

The *Canadian Architect and Builder* publishes with the January number an illustration of the design for the Provincial Parliament-House of Ontario, by Messrs. Darling & Curry, and gives in its letter-press an account of the reprehensible proceedings of the committee on the competition. It appears that the authors of the drawing published were awarded the first position, but the expert who judged the designs "did not consider them entitled to a premium because the limit of cost had been exceeded." A second competition was entered into, the result of which was that working-drawings, specifications, and details were prepared for this design and for the first premiated design. Tenders were obtained, and the premiated design came out at $542,000, and this one at $612,000. Both were Canadian firms. However, the Government would not proceed with the works because of the cost. Ultimately, they obtained a vote of $750,000, and submitted the two designs to Mr. R. A. Waite, of Buffalo, who was to decide on their relative merits. The result was, both designs were thrown out, and Mr. Waite was employed to prepare designs of his own for the building, which are now being proceeded with. The first contract let exceeds the appropriation for the entire building ($750,000).

The competition for the Toronto Board of Trade block of offices was decided on January 26 at a meeting of the Property Committee. Professor Ware returned three sets of designs with his report, and the decision remained with the Committee as to which of the three should be accepted. Nineteen sets were sent in, two-fifths of these being from architects in the States; the rest being from local architects. Messrs. James & James, of New York, are the successful men; the four invited competitors, two Canadians and two Americans, receiving each $400 for their designs. Messrs. James & James are Englishmen, who opened their offices in New York about two years ago, and their design is very prettily got up in pen-and-ink, though it is a matter of considerable doubt as to whether it can be carried out for the stipulated sum — $200,000. The Committee can hardly be said to have made the best choice, for the authors of this design appear to be little acquainted with requirements of a city such as Toronto, with regard to the office-rooms, or with the climate in reference to the heating-apparatus. Light in the corridors, elevators, back offices and main staircase, except as may be provided artificially, is apparently considered unnecessary, our bright Canadian climate being accredited with powers which it hardly possesses, such of going round corners and along long, narrow passages, shining through walls three feet thick, and beautifully illuminating offices and water-closets at the bottom of a well, enclosed with solid brick walls to, at least, fifty feet of its height. Neither are Canadians supposed to have nasal organs of very good quality, as some twenty-five water-closets and an equal number of urinals ventilate into the area which lights two offices and the staircase on every floor. Perhaps a description of this building may be wearisome to non-competitors, but so much interest has been shown not only by architects in the City of Toronto but by architects generally in the Dominion, and the people, especially of the Province, that for the benefit of those unable to see the drawings a few words may be acceptable. The Secretary tells me that several matters of detail will be reconsidered: as, for instance, the excessive size of the restaurant in the basement; the want of space for coal and the heating-apparatus; the arrangements of the banking-room which afford far too small a place for clerks and give too much for the public; the awkward arrangement of putting the secretary's office (on the Board of Trade floor) at a considerable distance from his clerk's room, and half-a-dozen such items which, it rather strikes an outsider, should have been considered before the design was accepted. A member of the Board of Trade remarked to me when I was looking at the drawings, that for his part he thought it a very unsatisfactory arrangement that the vaults for the use of tenants should be entirely separate from the offices, and cut off from them by public passages into which they open, being carried up in one stack, in, as nearly as possible, the centre of the building, necessitating long journeys on the part of tenants, with armfuls of papers and books along the public corridors, attended by a clerk to open the vault, light the necessary gas-lamp and close it up fast again after every visit to it, with perhaps a new "combination" every time. The building contains between forty and fifty offices only; a small number compared with some of the other designs, and all the rooms are about twenty feet deep, except such as may be shortened some three feet or so by cupboards and closets. The main hall of the Board of Trade suite of rooms is circular on plan, fifty feet in diameter, entailing a number of three-cornered spaces which have been worked in as closets in every direction. Externally, the design is good, in what we may call the present American style of bold features; the lower floors having heavy horizontal lintels, and the upper semi-circular heads; but the treatment of these upper stories runs into Gothic, with gables over each window of the Board of

Trade rotunda. There is a high pitched roof at the corner of the site over the rotunda, with an open turret for a finial.

The three designs returned by the Professor to the Committee were by Messrs. Darling & Curry, Messrs. Helliwell & Jordon and the accepted one. The two former firms are both of Toronto, and as has been said the authors of the accepted design are English. For a long time the design by Messrs. Darling & Curry hung in the balance with that of Messrs. James & James, it is still doubtful, whether, after all, their design may not be carried out. There is still the question of cost, which, it is possible when tenders are received, may throw out the accepted design.

OPENING OF THE HAWARA PYRAMID.

MR. W. F. FLINDERS PETRIE has at last accomplished the difficult task which he began last season. He has succeeded in forcing an entrance into the sepulchral chamber of the Pyramid of Amenemhat III. at Hawara, in the Fayûm. In our last report of Mr. Petrie's work, we related how he had tunnelled a passage from the north face of the pyramid as far as the stone casing of the central chamber, which proved to be enormously massive and resisted all his efforts. The summer was then so far advanced and the heat had become so overwhelming that he found himself compelled, very reluctantly, to postpone the completion of his operations till the present winter. Returning to Egypt in November last, Mr. Petrie at once went back to Hawara, and began by making trial excavations at various points round the base of the pyramid, in the hope of discovering the original entrance. Failing in these attempts, he decided to call in the assistance of skilled masons from Cairo, and quarry down through the roof of the central chamber, which he had already reached last season. The fact that the roof is fifteen feet thick and that it has taken Mr. Petrie's masons some three weeks to cut a very small vertical shaft through it, gives some notion of the massiveness of the structure. Once in, the secret of the true entrance-passage was disclosed, and the explorer was free to track the path by which he might have made his way into the central chamber had he but succeeded in finding the point from which it started. That point proves to be outside the pyramid, and apparently at some distance from it; so that the tomb of the founder may have been entered from the adjoining Labyrinth, the site of which was identified last year by Mr. Petrie. This may, in fact, be what Herodotus intended to convey when he said, "At the corner of the Labyrinth stands a pyramid forty fathoms high, with large figures engraved on it; which is entered by a subterranean-passage" (Book II. chapter 148).

Entry from a distance, by means of a subterranean-passage, is a novelty in construction, and has no precedent in any of the Ghizeh pyramids (fourth dynasty), nor yet in those of the sixth dynasty, of which so many were recently opened at Sakkarah. This, indeed, is the first time that the plan of a royal tomb of the twelfth dynasty has been laid open, and it differs very considerably from the plan observed by the architects of the ancient Empire. The Great Pyramid and all the other pyramids of the Ghizeh group, the pyramid of Meydûm and the Sakkarah pyramids have the entrance-passage in the centre of the north face of the structure, and at some height from the level of the desert; but the pyramid of Amenemhat III is entered from the south side, and by an opening, not in the middle of the side, but at about one-fourth of the distance from the southwest corner. It is here that the subterranean-passage, from whatever point conducted, strikes the south face of the structure. The ups and downs of the passages in the earlier pyramids are not many, and the obstacles placed in the way of possible intruders consist chiefly of a series of massive granite portcullises, let down from above, after the mummy had been deposited in its last resting-place; but the defences of the pyramid of Amenemhat III are of a different kind, and more nearly resemble the baffling turns and windings and wells of the rock-cut sepulchre of Seti I at Thebes. It marks, in fact, the transition from the Memphite to the Theban style of sepulture. "The passage," says Mr. Petrie, "does not run straight into the chamber, but slopes down northward for some distance. Then a branch-passage leads eastward, the main line continuing on, as a blind. The branch-passage (still going eastward) ends blank, but the issue from it is by a large trap-door in the roof. This trap-door opens into an upper passage leading north, which presently turns off to the west. Here it again ends blank and another roof-trap gives access to another upper passage running farther west. This passage ends in a well leading to a short passage southward, which ends in another well now full of water. This well, I imagine, must lead to another short passage going eastward, whence a last well would ascend into the chamber."

The pyramid, as Mr. Petrie feared and expected, had been broken into and plundered long ago — probably in the time of the Persian rule in Egypt. A forced entrance has been made from the second roof-trap into the sepulchral chamber, and anything of portable value which that chamber contained has, of course, disappeared. The chamber itself, which is three feet deep in water, is all but monolithic, the floor and the four sides, up to a height of six feet (inside measurement), being hollowed out of a single block of sandstone. The dimensions of the chamber are twenty-two feet long by eight feet wide inside, and Mr. Petrie estimates the weight of the block as from one to two hundred tons. One course of stone all round supports the roofing-slabs, of which there are but three. This chamber contains one large and one smaller sarcophagus of polished sandstone, both perfectly plain and without inscriptions. A projecting plinth decorated with panelled ornaments runs round the base of the large sarcophagus. The second sarcophagus has been contrived by the insertion of a head and a foot slab between the large one and the wall, and this has been closed over by a narrow lid. There were also two boxes of polished limestone in the chamber, decorated round the base with the same panelling as the large sarcophagus. One of these is broken up. A similar kind of stone box, it may be remembered, was found in the pyramid of the Pepi-Merira (sixth dynasty), which was opened some eight or nine years ago. Some fragments of alabaster vessels have been recovered from the water in the chamber, but these, like the sarcophagi and the boxes, are uninscribed, with the exception of one fragment of an alabaster vase, which bears the name of Amenemhat III. The walls, also, as far as Mr. Petrie has been able to examine them, are quite plain, thus differing from the pyramids of Unas, Pepi, and Tota of the fifth and sixth dynasties, which are lined with religious texts of great value and interest. That the great sarcophagus is the sarcophagus of Amenemhat III, and that the pyramid is his pyramid, admits, however, of no shadow of doubt. In the ruins of the two temples adjoining the pyramid, Mr. Petrie last year found fragments of inscriptions, in which the names and titles of this king repeatedly occurred, to say nothing of classic tradition, which has consistently assigned the pyramid "at the corner of the Labyrinth" to the royal builder of that famous structure. But for whom was the second and smaller sarcophagus constructed? Mr. Petrie suggests that it may have been for Amenemhat IV, who was for several years associated with his father upon the throne; or for Queen Sebakneferu, who succeeded her brother, Amenemhat IV. Either conjecture is probable; but, remembering that Diodorus attributes one of the Hawara colossi to Amenemhat III, and the other to his queen, and that he further states how the revenues derived from the fisheries of Lake Mœris were assigned to this royal lady "for her perfumes and her toilette," we are tempted to inquire whether a wife so honored as this tradition implies would not have been the more likely occupant of the lesser sarcophagus?

Simultaneously with his work on the pyramid, Mr. Petrie has also been continuing his excavations in the neighboring cemetery, where he has found many large tombs of the twelfth dynasty and a few inscriptions of that period. Besides the usual yield of amulets, beads, etc., he has also found three large and quite perfect Greek deeds of the Christian period, beautifully written on papyrus, and a few more mummies of the same type as those exhibited last summer in the Egyptian Hall, Piccadilly, with panel-portraits laid over the faces of the dead. Mr. Petrie will probably next attack the pyramid of Illahun, which, it is supposed, has never been opened. It is, however, very unlikely that any pyramid has escaped being plundered by either the Persian, Roman, or Arab conquerors of ancient times. — *Correspondence, London Times.*

ILLEGAL COMMISSIONS.

IN view of the fact that many in the community believe that architects, as a rule, do accept commissions, and that successful material-men pay commissions as a matter of course, it is not strange to find movements instituted on the part of both the architects and material-men looking to a correction of public sentiment in this regard. We have already referred to the action of the architects in their professional organizations. They have taken such steps as make it inexpedient, to say the least, for any member to take a commission or fee of any kind from any one except his legal clients. On the other hand, certain leading material-men, not content with the simple denial of the assertion that they pay commissions, are energetically following up every charge of this kind, and by bringing

their accusers into court, either through libel-suit or otherwise, are showing that they are not to be trifled with in this manner. Prominent among those who are now acting in this manner are Merchant & Co., of Philadelphia. Out of a number of cases pending in different parts of the country, they have recently put their accusers to rout in two instances, to the serious financial cost of those who have carelessly asserted that commissions to architects are the reason for the preference for their roofing-plates. With still other suits pending, and being vigorously pushed, it is fair for the trade at large to assume that it is not safe to charge this house, at least, with dishonest practices. We hope their good work in this direction will receive the support it deserves, first, from others in correlated lines of trade, who, in justice to themselves, should emulate the example thus set them; and, second, from the roofers and other sub-contractors, who can be of substantial assistance in bringing offenders to the test. Commissions to architects are wrong — wrong to the man who receives them, wrong to the man who pays them, wrong to the house-owner, whose interests are trifled with whenever they are paid, and wrong to the community at large, whose fair name is tarnished by every transaction that is not strictly honest. It is manifestly appropriate that a house that has been conspicuous in its stand in the past for honesty in the tin-plate trade should lead in this movement. But we say again we hope, for the sake of good morals and good buildings, others will follow their example, and that the good work may go on to its conclusion — when no commissions will be paid, and no one will be accused of paying them. — *The Metal-Worker.*

PHILADELPHIA, February 9, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs,— We enclose you the foregoing article from the editorial columns of the *Metal-Worker*, which may be of interest to you. We have just finished *our third* suit against roofers in past five months, and have commenced the fourth against a firm who have charged an architect "with taking a commission, and our firm with paying him." As our attorney requests us to send him our check for $500 as a retaining-fee, which, he assures us, "will not be all required," you can understand what reform in the roofs means. We propose to carry this suit to the end if the cost is ten times the amount demanded, and we simply mention this to satisfy you of our intention in all such cases to stop at no expense.

Yours truly, MERCHANT & CO.

[IT is a great pity that architects will not bestir themselves as actively in their own behalf as does this generous-minded ally of theirs. The insinuation that architects — not a few, but all — are always ready to accept a bribe from material-men is to be heard on every side and is a greater menace to the profession than all the improper competitions that have ever been devised. It is a matter for the architectural societies to take up and investigate fully, if only for the selfish reason that the public may know just how it is possible for one man to do a job for one per cent or less, while his neighbor demands upwards of five per cent for what seems to be the same service. It is a matter that should receive the first attention of the new American Institute of Architects, who cannot afford to have in good-membership a single member against whom the charge of accepting a commission or bribe can be proved. The members of the new Institute should be above suspicion on this head even if they cannot design a hen-coop, or compute the commission on it. We probably hear more of these accusations than architects themselves do, and at the same time we probably hear only a tithe of what the general public hears. It is a vastly greater danger than the "competition evil" in that it is concealed. Slander and back-biting are to improper conditions of competition as the cobra is to the rattlesnake. — EDS. AMERICAN ARCHITECT.]

SOCIETIES

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.

THE ninth annual meeting of the Engineers' Society of Western Pennsylvania was held in the commodious rooms of the Society in the Penn Building, Pittsburgh, Pa., on the evening of January 22d.

The reports of the Secretary, Treasurer and Chairman of the Library Committee showed the Society to be in a very satisfactory condition. The attendance at the meetings and the general interest taken in the proceedings during the year have been, indeed, flattering, the average attendance being fifty-three. The financial status is encouraging, and the library is being increased by regular additions, much of which is due to the interest and energy of those charged with its direction.

The retiring President read his address, giving a review of the points of general interest to the members, and making some suggestions relative to future action. The election of officers for the ensuing year was held, and the recommendation of the Nominating Committee was ratified in the choice of Jno. Brashear for President; A. E. Hunt, Jr., Vice-President; Wm. Metcalf and M. J. Becker, Directors; Col. S. M. Wickersham, Secretary, and A. E. Frost, Treasurer. After the election of five new members the meeting adjourned, but the members did not retire until they had gratified themselves with the tempting collation that had been provided as a surprise by a few of the members as a compliment to their fellows. A very pleasant "sociable" was thus indulged in to the pleasure of all present, which they would do well to repeat, as it affords culture to the "social qualities" too often neglected. The next meeting will be held on the third Tuesday of February (the 18th) at which an interesting paper will be read by H. D. Hibbard on the "Thomson Electric-Welding Process."

Any engineers from other societies or other parts of the country, in Pittsburgh are kindly welcomed to call at our meetings or at the rooms at any time. S. M. WICKERSHAM, *Secretary.*

THE COLUMBUS ARCHITECTURAL SKETCH CLUB.

IN order to bring ourselves before the public, I have, as Secretary of the Club, been instructed to write to your paper and notify you of the existence of the Columbus Architectural Sketch Club.

Our Club was organized in April, 1887, and has steadily increased in membership.

We have lately moved into our cosy club-room, which has been fitted up at considerable expense.

We have meetings every Thursday evening, each of which is devoted to a special subject.

Our programme is divided into four distinct parts, *viz.:*

A monthly competition.
Papers by the members.
Free-hand sketches.
Black-board problems.

In June and December we have exhibitions of all drawings submitted in the competitions during the intervening six months.

By publishing this letter you will confer a great favor on the members of the Club. Respectfully yours,

HARRY W. LUMB, *Secretary.*

COMMUNICATIONS

FIXTURES.

ROCHESTER, N. Y., February 7, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Will you please explain to me through the *American Architect*, just what is meant by all the fixtures necessary to render a house fit for occupation, as mentioned in the schedule of charges of the American Institute of Architects. For instance, if a client wanted a small cupboard or locker with an elaborately carved facing built into a wall of one of the rooms, or an expensive window-seat built in somewhere, would these come under the head of fixtures? Or say a fancy sideboard or clock or other numerous articles that may be built into a house. If these are all fixtures, then the only things that are not, are chairs and tables, and if they are not, where is the line to be drawn. An answer to this will greatly oblige, Yours truly, GREEN.

[THIS is a very indefinite expression, as most architects learn to their cost. It is generally understood to mean that the architect is entitled to include, in the sum on which his percentage is reckoned, the heating-apparatus, gas-fitters', steam-fitters', electricians' and plumbers' work, and so on, although the owner may have selected his own furnace, or made a contract for his own steam or hot-water apparatus, gas-fitting, plumbing, and so on. The reason of this of course is that the architect has to consider all these things in arranging his plans, and that the owner has no right to deprive him of compensation for his skill and care on account of the trifling circumstances of having spent a few minutes, in place of the architect, in making the actual contract for the work. How far the same rule is to be applied to "fittings" in the nature of furniture is a question much discussed. Many, perhaps most, architects will select or design the mantels, and allow their cost to be added to that of the house in calculating their commission. Many others, however, consider this unfair to them, and charge ten, fifteen or twenty per cent on the cost of the mantels, as a separate compensation for selecting or designing them. While a doubt may thus exist as to whether mantels are "fittings" or "furniture," there could hardly be any in regard to sideboards or clocks, or even carved cupboards, unless these formed an essential part of the design of a room, and few clients would be unreasonable on such a point. — EDS AMERICAN ARCHITECT.]

A CORRECTION.

NEW YORK, N. Y., February 11, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I see in No. 685 of *American Architect* a view of a house at Albany, said to be that of Charles Pruyn, Esq. It is a mistake, the house in question is the property of Robert C. Pruyn, Esq. Yours truly, ROBERT W. GIBSON.

[WE regret the mistake which was due to misinformation on the part of a correspondent in Albany. — EDS. AMERICAN ARCHITECT.]

THE GOVERNMENT EXAMINATION FOR DRAUGHTSMEN.

NEW YORK, N. Y., February 9, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I notice in your issue of "January 26" there seems to be an impression that the Civil Service Examination Grade is too high. As a participant I did not find it so. It consisted of practical work, such as any draughtsman, worth $5.00 to $6.00 per day is liable to be called on to perform and should be competent to do. As for the charge that none of the candidates could answer the questions, my certificate from the United States declaring that I passed the

examination is proof to the contrary. I do not wish to defend or uphold Mr. Freret in reported actions at Washington, but believe in giving credit where credit is due. Edwin R. Storm.

NOTES AND CLIPPINGS

The Burning of Rome.—Professor Lanciani's "*Ancient Rome*" throws new light upon the subject of the conflagration of Rome by Nero, or, at least, presents the matter in a manner which will appear original to many people. The burning of Rome was undertaken as a hygienic measure to accomplish better sanitation for the Eternal City. The author says: "Nero conceived the gigantic plan of renewing and of rebuilding from the very foundations not only the imperial residence, but the whole metropolis; and, as the metropolis was crowded at every corner with shrines and altars and small temples, which religious superstition made absolutely inviolable, and as the slightest work of improvement was fiercely opposed by private owners of property, and gave occasion to an endless amount of law-suits and appraisals, and fights among the experts, he rid himself of all these difficulties in the simplest and cleverest way. He ordered his favorite architects, Severus and Celer, to draw a new plan of the city, and to draw it according to the best principles of hygiene and comfort; then he caused an enormous number of wooden booths and tents to be secretly prepared, and ordered fleets of grain-laden vessels to be kept in readiness to sail from the various harbors of the Mediterranean at a moment's notice. Having taken all these precautions, and secured the success of his stratagem as far as human foresight could, Nero set the whole city into a blaze of fire, and did it so neatly that, although of the fourteen regions or wards into which Rome had been divided by Augustus, three were annihilated completely, and seven for the greater part, yet not a single human life seems to have been lost in the gigantic conflagration. The homeless crowds found a ready and comfortable shelter under the booths and tents, raised by thousands in public parks and squares; at the same time, a large number of vessels laden with grain from Sardinia, Sicily, Numidia, and Egypt appeared at the mouth of the Tiber, and relieved the emperor from any anxiety as far as famine was concerned. Even in our age of progress and material improvement and comfort, we cannot help admiring the profound wisdom shown by the two imperial architects, Severus and Celer, in designing and rebuilding the city. The straight line and the right angle were followed, as far as could be done in a hilly region, in tracing the new streets and avenues through the still smoking ruins. Hasty and irregular constructions were forbidden; the line of frontage of each new building had to be sanctioned and approved by one of the official surveyors. Large squares were opened in place of filthy, thickly-inhabited quarters. The height of private houses was not allowed to exceed double the width of the street, and porticos were to be built in front of each one, to provide the citizens with cool, sheltered walks in case of rain or excessive heat. In the rebuilding of the city, the emperor secured for himself the lion's share; and his golden house, of which we possess such beautiful remains, occupied the whole extent from the Palatine to the Quirinal, where now the Central Railway station has been erected. Its area amounted to nearly a square mile, and this enormous district was appropriated, or rather usurped, by the emperor, right in the centre of a city numbering about two million inhabitants."

The Acropolis of To-day.—The town of Athens, and especially the Acropolis, is now passing through a very remarkable period in its existence. It is with mixed feelings that even those who reside here, and whose chief interest is in archæology, look upon the sweeping alterations that have quite changed the character of its appearance. The tendency to demolish all monuments of mediæval or modern history has been allowed free play of late years; in a short time hardly anything will be left that does not go back at least to Roman times. The line will probably be drawn here, though if one regards nothing but the work of the great age of Athens as worthy of preservation, it is hard to see why (for instance) the pedestal of Agrippa deserves more respect than the "Frankish tower," which certainly was more picturesque and of higher historical interest. But now it is too late to regret what may have been lost. Only two or three insignificant fragments of later walls remain, and those of quite recent period: when they are removed the Acropolis will appear—but for the wear and accidents of ages—much as it did when the so-called "Beulé gate" was first built. This is an intelligible aim, and we imagine it will now be recognized by all as the best attainable. The Acropolis can never again present that picturesque medley of historical associations and monuments of all periods that delighted the visitor twenty or thirty years ago; but we may hope, when the ugliness of recent excavations and alterations has worn off, when a painfully exact appearance of order and arrangement has been avoided (as is promised), and, above all, when the old verdure and flowers have once more spread over the whole, that a new and more purely classical charm may be found to have resulted from the temporary loss of beauty.—*Athens Correspondence London Athenæum.*

Teakwood.—So indestructible by wear or decay is the African teakwood, that vessels built of it have lasted fully 100 years, to be then broken up only on account of the poor sailing qualities on account of faulty models. The wood, in fact, is one of the most remarkable employed in human industries, on the score of its very great weight, hardiness and durability, its weight varying from some forty-two to fifty-two pounds per cubic foot. It works easily, but because of the large quantity of silex contained in it, the tools employed in its manipulation are in a short time worn away; it, however, possesses the advantage of containing an oil which prevents the spikes and other ironwork with which it may come in contact from rusting. The difference between this and the East Indian teakwood, though both are used for shipbuilding, is notable; the latter, which is really the most valuable timber produced in that country, is light and easily worked, strong, durable, not liable to the attacks of insects, abounds in silex, and resembles coarse mahogany. The tree requires some sixty to eighty years' growth to produce the size of timber preferred for shipbuilding, and much of it is used in England for this purpose.—*Pittsburgh Despatch.*

Prix de Reconnaissance.—The judgment of the Prix de Reconnaissance des Architectes Américains took place at the Ecole des Beaux-Arts yesterday. It was awarded to M. Huguet, pupil of M. Blondel. Honorable mentions were given to MM. Henry, Eustache and Jonkel, pupils of MM. Gaudet, Ginain and André.—*New York Herald, January 26, Paris Edition.*

TRADE SURVEYS

The chief value of many trade reviews of the day is found in the truth that the facts and conditions are already the reverse of what are set forth. Some of them are mere vehicles for erroneous opinions and statements. Much that is said is written with a view to influence public opinion wrongfully. A plain statement of facts and conditions is demanded just at this time, when the plans and programmes for the coming season are under consideration. The fact will not be disputed that at no time has the spirit of investment in Southern and Western mineral, lumber, mining and agricultural lands been stronger. Delegations of Eastern capitalists have been enjoying weeks' vacation in the newer sections of the country, looking after opportunities for investment. The outflow of Northern capital continues. A gradual appreciation of value is in progress. More industrial enterprises are projected at this time than ever. Southern journals which keep a faithful record of industrial progress prove it. The anxiety of capitalists to invest in remote localities, South and West, cannot be easily overstated. This rush means simply that land, mineral and timber values South are appreciating, and the State assessments show it. Lumber manufacturers, ore and coal miners, iron and steel makers, and manufacturers in scores of industries, are chasing each other in their haste and greed to buy up cheap lands to hold them for the advance which increasing population and industrial activity is sure to bring. Another false impression should be corrected, viz.: the impression sought to be made by ill-informed writers of financial articles, that railroad building is practically at an end for the present in this country. Nothing is farther from the truth. Since January 1, 3,500 miles of road have been projected. Prior to that date a careful estimate shows that between ten and twelve thousand miles of road were projected. This information is within the reach of any one who cares to keep posted. There are schemes incubating at this hour in Boston, New York and Philadelphia, covering contemplated operations in Canada, the United States, Mexico and South America, which swell the total aggregate of possible railroad enterprise to twenty thousand miles, a fact which can be demonstrated.

Because two-thirds or so of the rail-mill capacity of the country is just at this time idle is no reason why, in ninety days, work may not be abundant. Buyers and builders are purposely holding off. Even with all the lamentations over bad railroad returns, the net earnings on the trunk-lines in 1888 were only $3,000,000 less than in 1887. The iron-makers have been for months steadily increasing their production, and stocks to-day are practically unknown. The lumber manufacturers have sold their stocks down lower than usual, and are now awaiting the opportunity to pile up heavier stocks for the requirements of the coming season. The margins in trade are no closer than usual, failures are not shown to be more numerous, and general indebtedness is not increasing. In financial affairs there is no need of apprehension. Since 1879, the circulating medium has increased from $827,000,000 to $1,400,000,000 in round figures, and gold has increased $426,000,000. With pessimists, facts like these go for nothing. The sunshine side of business is unwelcome. Legitimate industry is well paid. Speculators have but little chance. Yet all is not smooth sailing in the business world. The trusts are thriving. New ones are coming up. Their profits are encouraging the spirit of combination, especially in financial affairs, but all these signs do not portend evil because of the general necessity for enlarged facilities for the transaction of business, just as eighty and ninety ton engines are found necessary on railroads, and 500-horse-power Corliss engines are found necessary in shops in place of 10-horse-power engines. Architects and builders may be as ignorant as some of their critics say they are, but any anxious inquirer can ascertain in any of the larger cities that there is fully as much work projected, and in some cities more than at this time last year. Civil, mechanical, and mining engineers of repute and experience do not say that there is any decline in work in their special fields. On the contrary, some of the most noted have stated, since January 1, that the volume of work is larger. This is proved by reports from the larger machine-shops where heavy machinery is made.

New mining enterprises are calling for a great deal; irrigation companies are large buyers; municipalities are large buyers of equipments and plants for gas, water and electricity. The bridge-builders are not working fewer hours this winter than they have worked for several years, and labor itself is no more disemployed than it has been for years at this season. Yet, there is no boom in sight. Producing capacity is being expanded just as rapidly as it is safe to do so. Borrowed money is very generally in safe hands. Our financial institutions are sound; our railroad-managers are in better shape than three months ago, although still badly enough off because of excessive competition and mileage. Shrewd and far-sighted business management are more in demand than ever in our history, because of the multiplication of agencies of all kinds, and the building up of so many new competing sources and centres; cornered schemers, defeated speculators, disemployed professional talent and incompetency of all kinds sees naught but trouble ahead, and observes only the reverse of the truth in plain statements of trade facts. It is a fact patent to all that there is now less idle capital than ever, and less idle labor than perhaps with one or two exceptions; that more houses were built in the country last year than ever in our history, and that the volume of business was larger, with one exception, than in our entire history. The country is in a transition state, but it is not in danger. Its financial system is not a permanent one, but the wisdom of its business men will solve the question of establishing a better one when the time comes. The complainers and fault-finders with business conditions and facts to-day are in the ranks of the incompetents.

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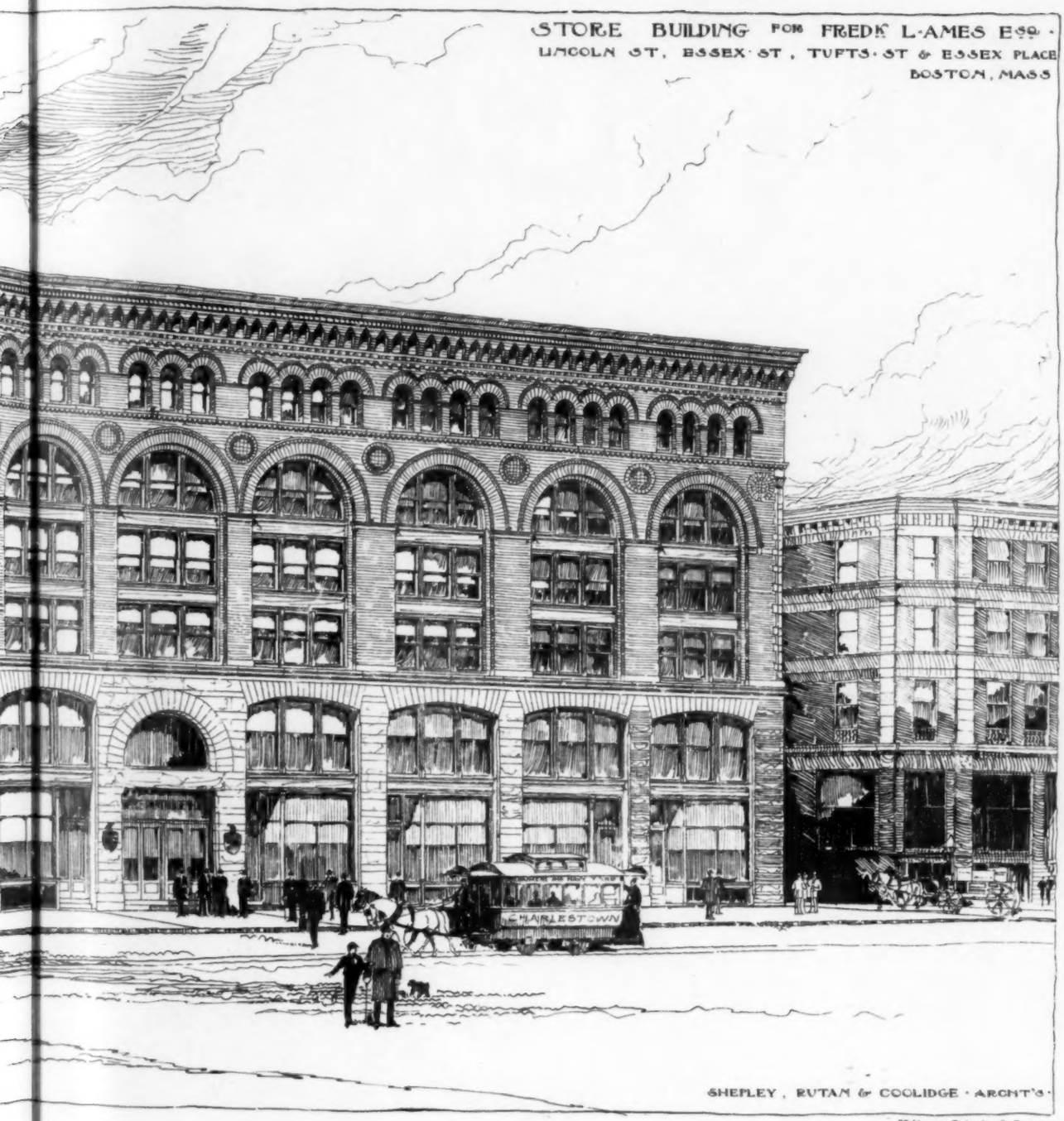

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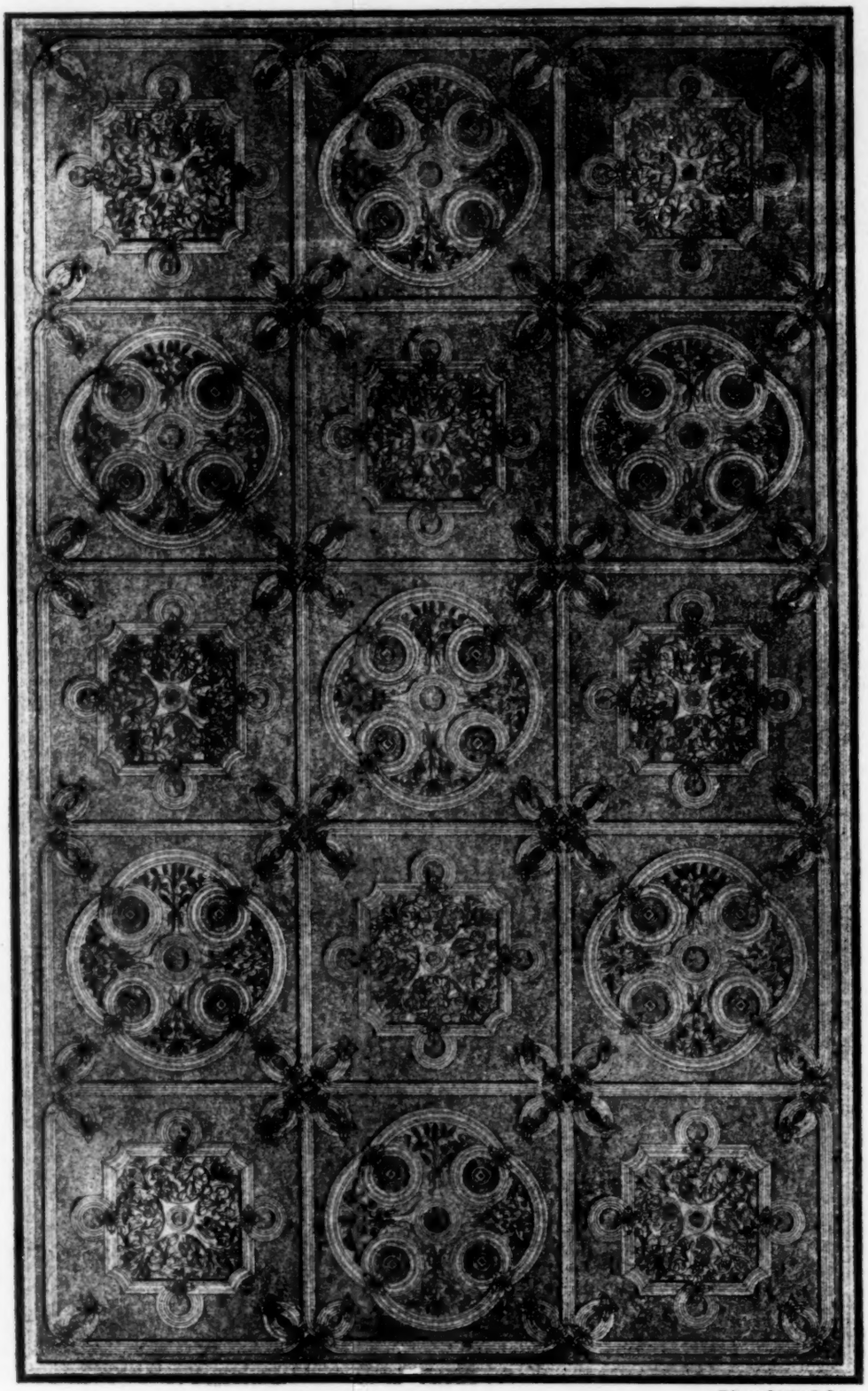

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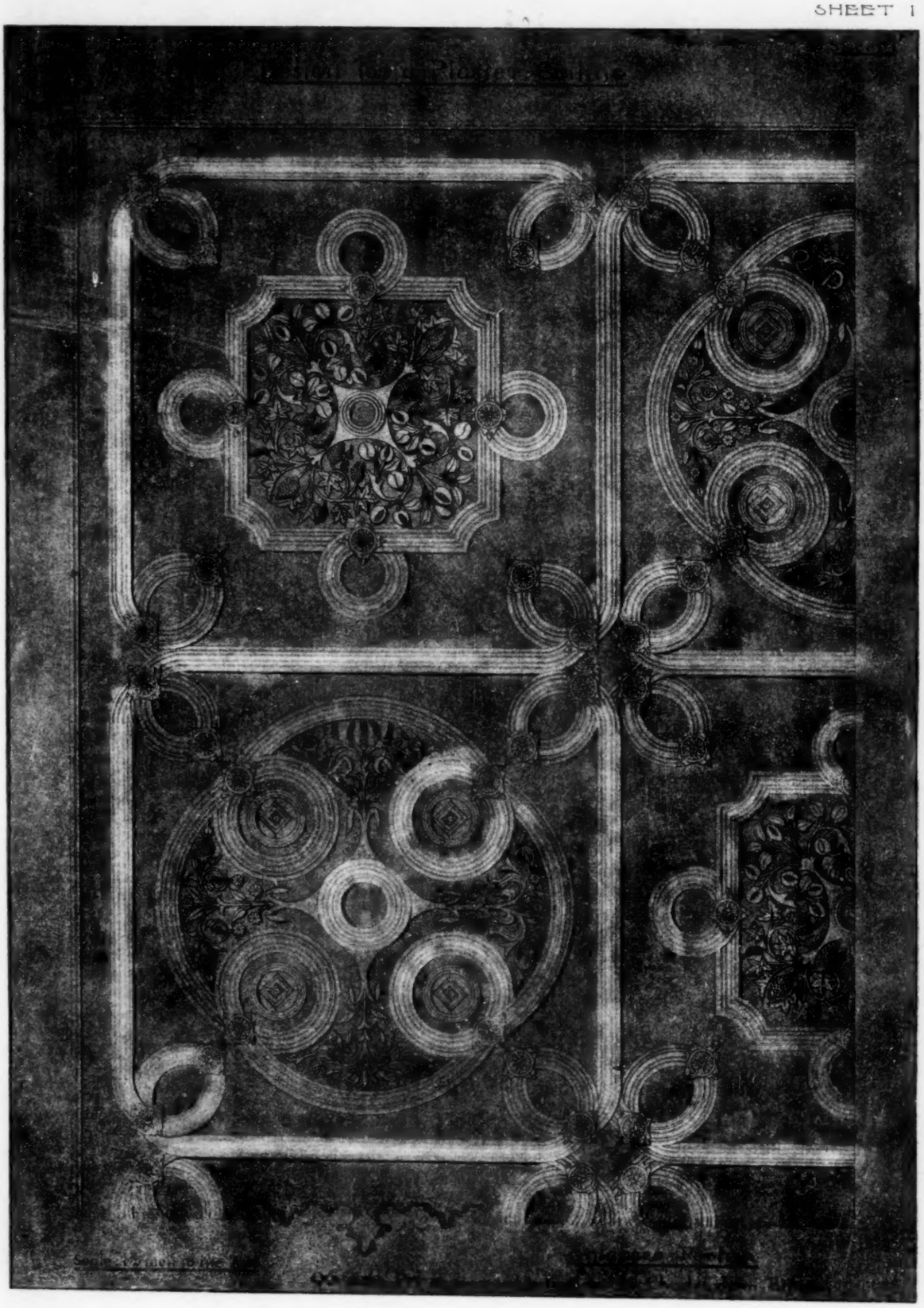

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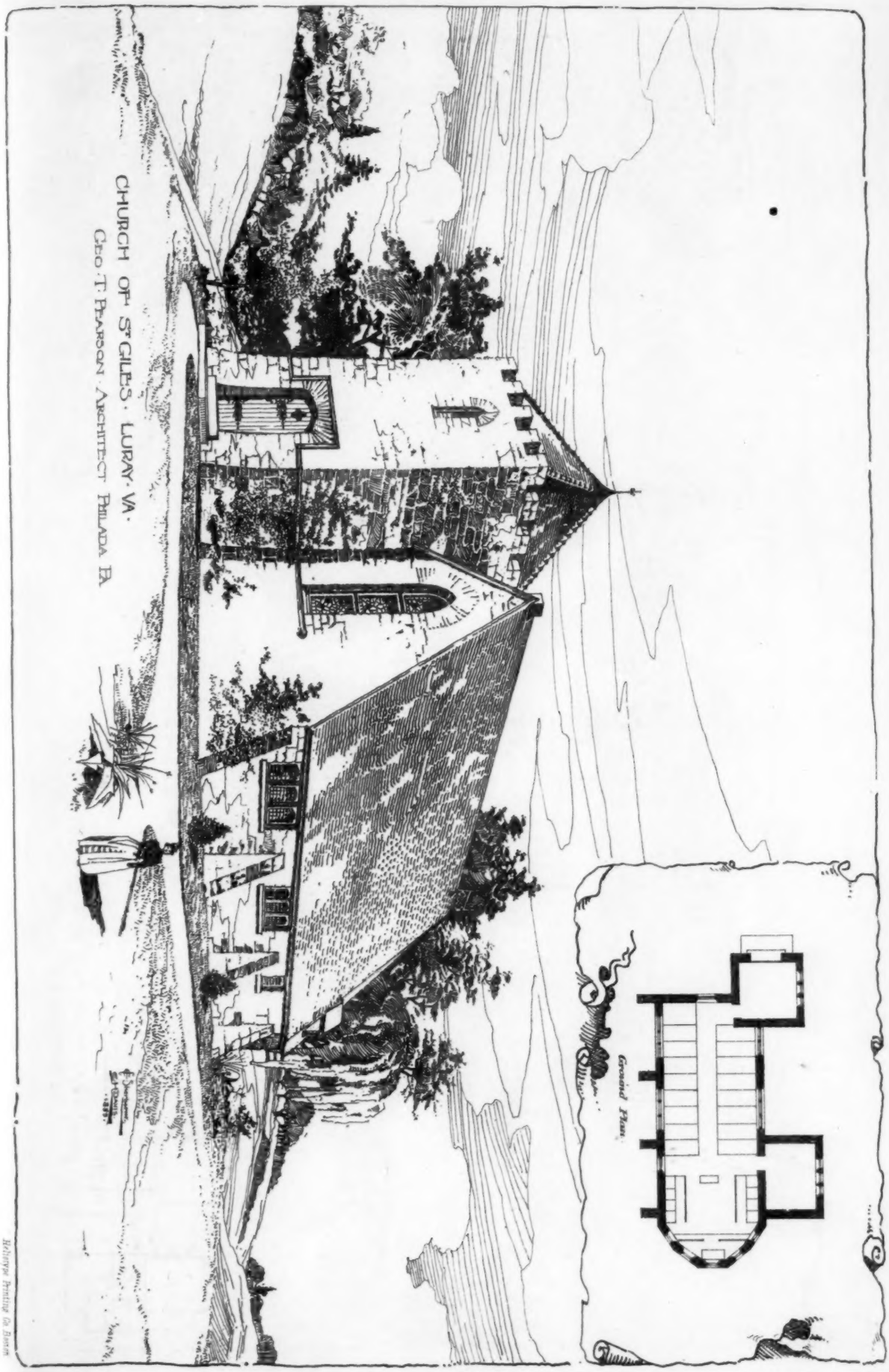

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